SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE, PUBLISHED MONTHLY

VOLUME I AUGUST, 1905 NUMBER 2

CYSTS OF THE THYROID GLAND. A CLINICAL AND PATHOLOGICAL STUDY

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THE experience of the surgical clinic and its pathological laboratory in lesions of the thyroid gland since the opening of the Hospital in June, 1889, up to the present time, a period of about sixteen years, has been as follows: simple goitre, 38 cases; exophthalmic goitre, 35 cases; cysts, 24 cases; fetal adenoma, 7 cases; mixed adenoma, 4 cases; adenoma with metastases, 1 case; carcinoma, 7 cases; sarcoma, 1 case; acute thyroiditis, 2 cases; chronic thyroiditis (senile), 1 case; fistula of the thyroglossus duct, 2 cases,— a total of one hundred and twenty-two cases. We have had no examples of tuberculosis or lues of the thyroid gland.

This first paper will be a presentation of a clinical and pathologic study of thyroid cysts, to be followed later by a more general discussion of all the pathologic lesions of the thyroid gland.

As an introduction it seems best to give a short summary of the various pathologic changes in the thyroid gland and their clinical pictures. Without this it would be difficult to present clearly the subject of cysts of the thyroid.

The thyroid, a ductless gland, in young embryonic life, is composed of acini lined by epithelial cells of a rather characteristic type, and the epithelial vesicle contains no colloid material. (Fig 1*a*.) Many of the acini are filled solidly with cells. The stroma is rather scanty and quite vascular. Tumors which resemble the fetal thyroid gland in its histology have been called *fetal adenoma*. (Fig. 2.) The clinical picture of these tumors is almost as distinctive as their pathological appearance.

Later in embryonic life colloid material appears in the epithelial acini, and with their distention with this material, the acinus becomes lined with a single layer of cells. (Fig. 1*b*.) The stroma of the adult thyroid is unusually vascular, as compared with other glands, and the walls of the vessels are comparatively thin. The disease of the thyroid gland commonly called simple goitre, differs from the normal thyroid (Fig. 3), chiefly in the larger size of the acinus, and this increase in diameter is due entirely to increase in the quantity of colloid material. (Fig. 4.)

When the thyroid of an animal is partially removed, the remaining portion of the gland undergoes a typical change, which may be called true hypertrophy. This consists of a gradual disappearance of the colloid material, a change in the morphology of the thyroid epithelium to one of a so-called higher type, an invagination of the wall of the acinus, which gives a larger surface for the epithelial lining, and proliferation of the epithelial cells with the formation of typical intra-acinous papillomatous groups. (Fig. 5.) This experimental hypertrophy was first investigated and established by Halsted. (The Johns Hopkins Hospital Bulletin, vol. i, p. 373.)

[From the Surgical Pathological Laboratory of Professor Halsted's Clinic, of the Johns Hopkins Hospital and University]

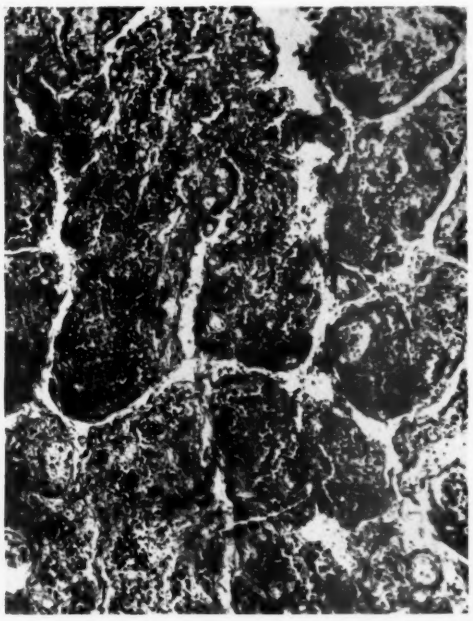

FIGURE 1a.—Thyroid of six months' fetus removed at autopsy (slightly pathologic).

It was very interesting to find that the histology of exophthalmic goitre is practically identical with that pictured by Halsted in his monograph just referred to. (Fig. 6.) The disease exophthalmic goitre is always associated with a distinct hypertrophy of the thyroid gland which may be called *exophthalmic hypertrophy*. The relation of this thyroid hypertrophy to exophthalmic goitre was first brought out by investigations in the surgical-pathological laboratory of the Johns Hopkins Hospital. This definite histological picture may be considered as the third variation in the thyroid gland. That is, we have as distinct pictures the fetal, the colloid, and the exophthalmic acinus or vesicle.

We may divide thyroid lesions into hypertrophies, tumors, and inflammations. Simple goitre and exophthalmic goitre represent the hypertrophies. Fetal adenoma, mixed adenoma, cysts, carcinoma, and sarcoma are the most common tumors. Acute and chronic inflammation are rather infrequent lesions.

Simple goitre is a symmetrical enlargement of the thyroid gland. The disease, whatever its etiology, apparently begins as a diffuse process, one lobe may be larger than the other, but for all practical purposes, one should insist that the term simple goitre be confined to the disease in which the entire thyroid is enlarged and which microscopically consists chiefly of dilated epithelial acini of various sizes, filled with comparatively normal colloid material. In this part of the country simple goitre is not common. The majority of our cases come from the mountainous regions of Pennsylvania, Maryland, and West Virginia. The enlargement of the thyroid gland is most frequently coincident with puberty, much less frequently in the male than in the female, and with pregnancy. The age of onset varies from fifteen to twenty-five years. In a carefully taken history, it is unique to establish the onset of a simple

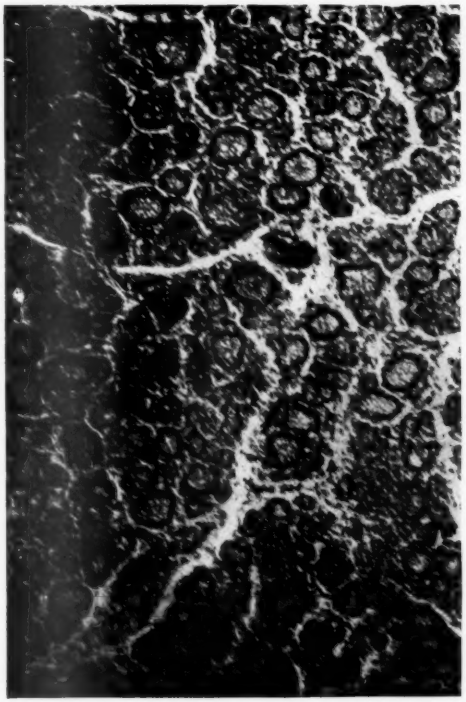

FIGURE 1b.—Thyroid of nine months' fetus removed at autopsy. This section contains some colloid material.

goitre, at least in our experience, after thirty. The enlargement of the thyroid is gradual. In the early months or years it may be associated with slight nervous symptoms, even palpitation and tremor, but never exophthalmos. For this reason, the early stage of a simple goitre may be mistaken and considered Graves' disease. When the enlargement reaches a certain size it becomes associated with symptoms easily explained by pressure, e. g. dyspnœa, change in the voice, cough, even bloody expectoration, and now and then, difficulty in swallowing. These symptoms, when associated with a large goitre, should give no anxiety. However, if they appear when the enlargement of the thyroid is comparatively small, one should be very suspicious of an infiltrating carcinoma.

Simple goitre has, therefore, a pretty distinct clinical picture.

FIGURE 2.—Microscopic drawing of fetal adenoma.

Exophthalmic goitre, when fully developed, exhibits a symptom complex not at all difficult to recognize. In these cases the gross and microscopic pathology of the thyroid gland always shows changes which can be recognized as the true hypertrophy previously mentioned and illustrated in Figs. 5 and 6. As a rule, the longer the duration of the symptoms, the more advanced and diffuse is this hypertrophy. However, we observe

in the early cases of a pretty definitely established exophthalmic goitre that the thyroid gland shows this hypertrophy only in small focal lesions. So far, in the experience of this surgical clinic, we have never removed a thyroid from a patient exhibiting symptoms of exophthalmic goitre, in which the gland, in some part, did not show an area of this easily recognizable hypertrophy. In a few cases in which the clinical symptoms were not absolutely established, the pathology of the thyroid gland was of itself sufficient to make the diagnosis positive.

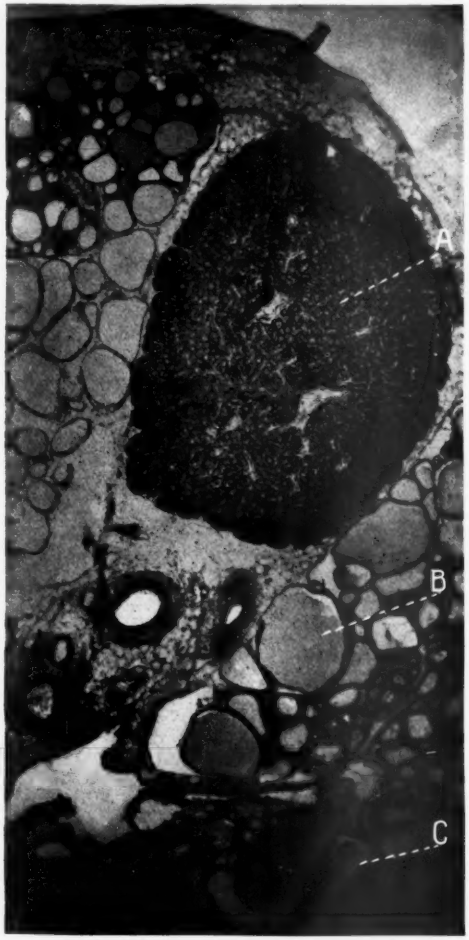

FIGURE 3.—(From microphotograph 1, Halsted, Johns Hopkins Hospital Reports, vol. 1, plate lxvii.) Normal thyroid of dog: a = parathyroid; b = normal colloid vesicle; c = young thyroid tissue.

At a recent meeting of the Medical Society of the Johns Hopkins Hospital (Monday, May 15, 1905), Dr. Halsted presented a paper on a clinical study of exophthalmic goitre, and Dr. McCallum one on its pathology. As these two papers are about to be published, it is unnecessary, in this contribution, to go into further details, except to mention that, with other diseases of the thyroid, we may have atypical exophthalmic goitre symptoms. Rarely, however, in this group do we observe the exophthalmos, but we do observe the nervousness, the tachycardia and the tremor in various degrees. These symptoms have been observed in simple goitre, in cysts, in fetal adenoma and, as Dr. Halsted mentioned in his contribution, sometimes in carcinoma. As a rule in this group of cases one will find cellular pictures in the thyroid tissue resembling exophthalmic hypertrophy.

The two lesions of the thyroid which produce a symmetrical enlargement of the gland, are simple goitre and exophthalmic goitre. The latter is recognized, as stated before, by its association with a definite symptom-complex, or, in early cases, when the clinical picture is still indefinite, by the microscopic examination of the removed thyroid gland. Inflammations of the thyroid, both acute and chronic, may be associated with a pretty symmetrical enlargement, but as a rule there are other local symptoms indicating the inflammatory nature of the lesion.

The other diseases of the thyroid gland exhibit themselves as asymmetrical, single or multiple, enlargements, and for this reason, should be differentiated from the symmetrical enlargements. These diseases are the cysts, the adenomata, and the carcinomata. The experience of this surgical clinic and the cases which I have studied in the literature demonstrate that there is little or no hope in carcinoma of the thyroid if the operation is performed after the tumor has reached that stage in which a clinical diagnosis can be made. That is, malignant tumors of the thyroid must be seen and removed in the early stage, a period in their growth when they cannot

FIGURE 4.—Microphotograph. Colloid vesicle of a simple goitre.

be differentiated from the benign cysts and adenomata. For this reason every asymmetrical enlargement of the thyroid gland in individuals over thirty years of age, should be subjected to operative removal. Only by following this rule will surgeons eradicate malignant tumors before they have given inoperable metastases. This subject will be considered more in detail in my second paper.

THYROID CYSTS

The age of onset in these tumors has varied between ten and sixty-five years of age. In the decades between ten and forty, the cases are pretty evenly divided; three cases were observed between forty and fifty, and only one after fifty years of age. In nine patients the tumor was observed between ten and twenty-four years of age, a period of life during which malignant tumors have not been found. In the remaining eleven cases the age of the patient, between thirty-two and sixty-five, would have suggested a possibility of a malignant tumor.

The duration of the tumor has varied from two weeks to fifty-three years. In twelve cases the tumor was of over three years' duration, and in seven cases over ten years' duration.

In only six cases, therefore, was the tumor of a duration of less than one year and six months. In this group the duration of the tumor would not allow a differential diagnosis from carcinoma. In carcinoma of the thyroid, as a rule within two years after the appearance of the tumor, there is an infiltration of the tissues beyond the capsule of the gland which allows a pretty positive clinical diagnosis. For this reason, if the asymmetrical tumor has been present three years or more, and is still confined to the thyroid gland, the probabilities are that it is either a benign cyst or adenoma, or an operable adenocarcinoma in its early stage.

There is no definite relation between the size of the cyst and its duration—in some cases the tumor reaches a large size in a comparatively short time, in other cases the tumor remains small over a comparatively long interval, in a few cases the tumor has remained small for a number of years, and

FIGURE 5.—(From microphoto. Halsted, l. c., plate lxxi, No. 5.) Advanced hypertrophy of thyroid in dog.

then suddenly has exhibited rapid growth. Quite frequently the tumors of long duration have varied in their size. This is quite a characteristic symptom of cystic tumors, no matter what their position. It is a very common occurrence in cystic tumors of the breast.

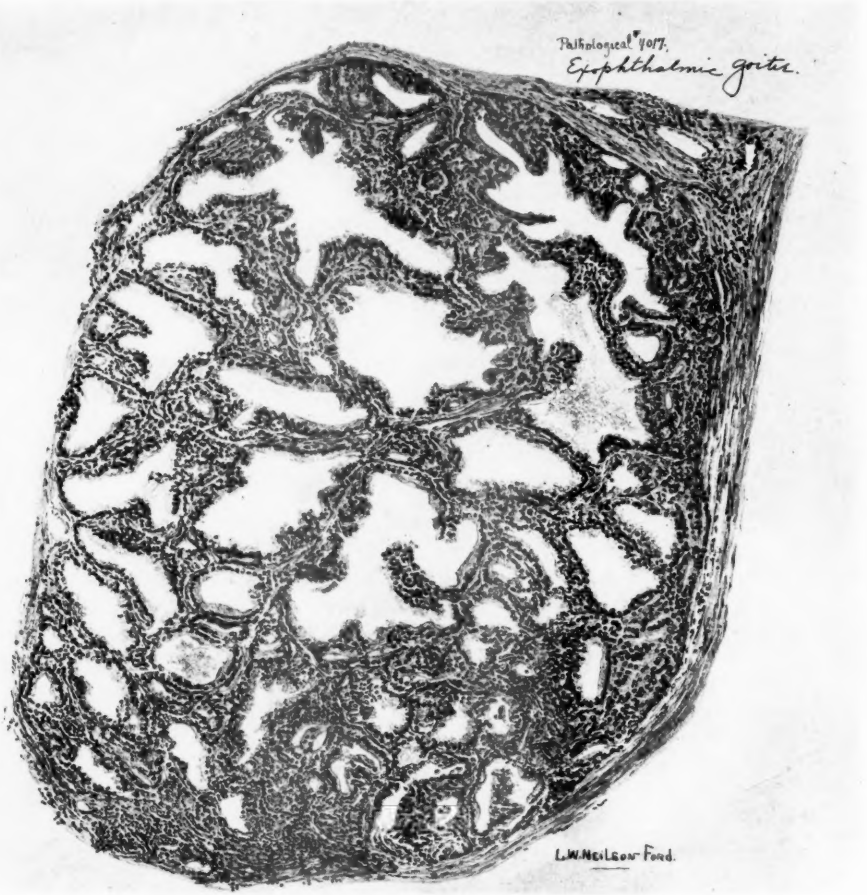

FIGURE 6.—Microscopic drawing of a case of exophthalmic goitre (Bloodgood, June, 1903).

In the clinical picture of a thyroid cyst we are interested in the following facts: Whether the onset of the tumor has any relation to puberty, pregnancy, the menopause, or traumatism; whether the cyst originates in a normal thyroid, or a thyroid the seat of some pathologic process, for example, thyroiditis, simple goitre, exophthalmic goitre, or fetal adenoma; whether the appearance of the cystic tumor is associated with any general symptoms suggesting exophthalmic goitre, or local symptoms indicating pressure; the position of the cyst, whether it arises within or without the isthmus or one of the lateral lobes of the thyroid gland.

The clinical history of our cases shows no definite relation to puberty, pregnancy, or the menopause. In females it is quite common to observe an enlargement of the thyroid gland at puberty, not infrequently this enlarge-

ment is considerable and associated with a great deal of discomfort. In my observation, these individuals have been neurotic. As a rule the enlargement of the thyroid disappears at about twenty-five years of age. Patients admitted to the clinic with simple goitre as a rule date the onset of the thyroid enlargement back to the age of puberty, or their first pregnancy.

In three of our cases of cysts of the thyroid, the tumors were observed before puberty; two of the patients were males; the remainder of the thyroid was apparently normal, in one the tumor had been present six years, in the other fifty-three years. The third patient was a female and the cyst was situated above the isthmus; it had been present twenty-three years. In these three cases there were no symptoms except tumor. The only other tumors of the thyroid which we observed before puberty, have been fetal adenomata, and in two instances the tumors were congenital.

In only one instance have I observed a cyst at puberty. This patient, a girl aged fifteen, came under my observation two weeks after the tumor had first been noticed. The entire thyroid gland was slightly enlarged, and one could see and feel in the right lobe, a small cyst. This patient has now been under my observation almost five years. Within a year the cystic tumor disappeared, and now the thyroid gland is about normal in size. In view of her youth, the small size of the tumor, and its association with the enlargement of the entire thyroid gland at puberty, I did not consider an operation indicated.

In only one case was the tumor first observed at a pregnancy. This patient came to the clinic nineteen years later. In one case the tumor, first observed before pregnancy, grew very rapidly during the pregnant period.

In one instance a very great enlargement of a previously small tumor was coincident with the menopause. This patient had had a small tumor the size of a walnut, in the right lobe, for seventeen years. At the menopause the tumor began to grow rapidly, in three years reached a great size, and produced pressure symptoms. In not a single instance has traumatism been noted as an etiological factor.

In regard to the condition of the remaining portion of the gland, we must base our knowledge chiefly on palpation of the thyroid before and during operation. In only two instances is it noted that the entire thyroid was slightly enlarged. One case I have previously mentioned, in which the cyst and the enlargement of the thyroid were observed during puberty. In the other case the tumor was situated in the left lobe. As in one case no operation was performed, and in the other only the cyst was removed, we were unable to have a microscopic examination of the thyroid gland.

In the majority of our cases only the cysts have been removed, for this reason we have been unable to study microscopically the remaining thyroid gland. In the few cases in which some part of the thyroid had been removed with the cyst no changes have been observed, except slight chronic thyroiditis and compression of the colloid alveoli. This point will be discussed again.

Cysts, in the experience of this surgical clinic, apparently arise in comparatively normal thyroid glands. In our cases of simple goitre we have observed no large cysts. In the other lesions of the thyroid gland macroscopic cysts have not been seen.

The most interesting clinical fact is the relation between the cyst and certain general symptoms, somewhat like those of exophthalmic goitre. These symptoms have been observed in a certain number of cases after the appearance of the tumor, and have practically disappeared after its operative removal. Thirteen patients exhibited no definite symptoms, except the thyroid tumor. The absolute accuracy of this fact can be established in a large number, in a few cases the history is somewhat indefinite, but there is no doubt that one may have a cyst of the thyroid without any symptoms except the tumor. Now and then the patient may not be aware of any effect of the tumor until after it is removed. In one of my own patients (see Fig. 10, Case v), there had been a cyst of the left lobe twelve years, and of the right lobe five years. She was a girl of twenty-

nine when she came under my observation. The patient appeared in good health, and exhibited no nervous phenomena. After the removal, however, of both tumors, the young woman informed me that she improved very much, there was a gain in weight of about ten pounds, and she stated that she was much less nervous and could perform her day's work as a saleswoman with much less fatigue.

In three patients with comparatively large

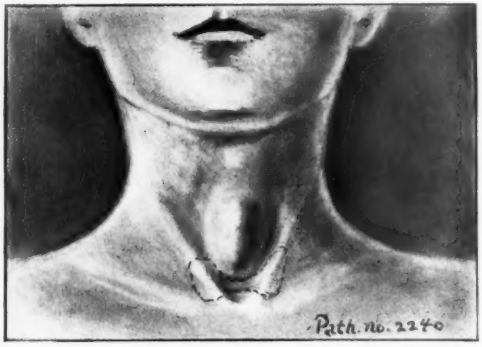

FIGURE 7.—Sketch of patient. Case II. Medial thyroid cyst above isthmus.

tumors, there were slight pressure symptoms. In one there was also considerable nervousness. In all the symptoms were relieved after the removal of the tumor.

In five cases the general symptoms were pretty definite. One had distinct exophthalmos, another slight prominence of the eyes. These two cases had, in addition, tremor and tachycardia. Two patients had tremor and tachycardia, but no exophthalmos. One patient had very marked nervous symptoms with attacks of angio-neurotic œdema and melancholia, but as these symptoms disappeared after a hysterectomy for a myoma of the uterus, they probably had nothing to do with the cyst of the thyroid, which was not removed until three years later.

In the remaining four cases the nervous symptoms and in two the exophthalmos, were completely relieved by the removal of the cyst.

In addition to these five cases which have been subjected to operation, I have records of two others. One I saw with my colleague, Dr. Russell, last June. The patient had observed an enlargement of the right lobe of the thyroid for three years. During the last year she had been very nervous and suffered with palpitation of the heart, diarrhœa and tremor. Dr. Russell found and removed a large myoma of the uterus. The symptoms just mentioned were not exaggerated by the operative procedure, and as the cystic tumor was small I advised delay of the operation. Unfortunately I have not heard from this patient since. Recently Dr. Kahn, of Baltimore, referred to me a female aged sixty, with an asymmetrical swelling of the right lobe of the thyroid, of five years duration. During the last two years the patient has been very nervous and restless, and at the examination there were tremor and tachycardia, but no exophthalmos.

As Dr. Halsted, in his communication, will consider especially this group with atypical exophthalmic symptoms, further details need not be considered in this paper.

Position of the Cysts: In five cases the cyst has been observed in the median line: in three cases above the isthmus, in one below, and in one case in the isthmus itself. In eleven cases the tumor was situated in the right lobe, in four of these the cyst was outside of the thyroid gland. In six cases the cyst was situated on the left side. None were observed outside the lobe. In two cases there were cysts in each lobe of the thyroid.

CYSTS OF THE ISTHMUS

These medial spherical tumors are not difficult to recognize. They move with the thyroid slightly with deglutition. The one situated within the isthmus was less freely movable, but moved more with deglutition than the four cases situated outside the isthmus. The size of the cyst has varied from 2 cm. to that of a large orange. In three cases the cysts occupied the area of the neck between the thyroid cartilage and the sternum, none projected beneath the sternum.

CASE I. SURG. NO. 1276. Colored female, aged 39. The tumor was first observed nineteen years ago, during her first pregnancy; the growth has been slow, change in size has been observed, and there have been no symptoms except tumor. The spherical, elastic

tumor the size of an apple, is freely movable in the neck between the thyroid cartilage and a point 2 cm. above the suprasternal notch. It moved but slightly with deglutition. At operation it was attached to the isthmus by a small pedicle of connective tissue. There is no pathological note, and the patient has been lost track of.

CASE II. SURG. NO. 2240. White female, aged 55. The tumor has been present many years. There have been no nervous symptoms. The tumor is situated between the isthmus and thyroid (see Fig 7), it is freely movable, scarcely moved with deglutition, and there is fluctuation. At operation it was situated above the isthmus, and had no apparent connection with the thyroid gland. The cyst had a thin wall and hemorrhagic contents. There is no further pathological report. In 1903, ten years after operation, this patient was well. This tumor may have been a cyst of the thyroglossus duct.

CASE III. PATH. NO. 4468. Figure 8 is the photograph of the alcohol specimen and illustrates beautifully a pedunculated tumor arising from the isthmus of a normal thyroid gland. The specimen was sent to me from an autopsy at the Bay View Hospital in Baltimore without clinical data. I include it in this report because it is our best illustration of a small cyst undoubtedly originally a solid colloid adenoma. The pedicle is composed of fibrous tissue, the cyst has a distinct fibrous capsule of about three mm. thickness. Within the wall there is an irregular zone of colloid material, showing distinct lobules of various size. The center of the tumor contained a clear fluid. The microscopic section (Fig. 4), demonstrates that the tissue within the wall of the cyst is composed of large colloid alveoli lined by a single layer of thyroid epithelium. Between the alveoli there is very little connective tissue, there are no areas of hemorrhage, no evidence of proliferation of the epithelium within the colloid alveolus, and no areas of young thyroid. We have, therefore, an example of a pure colloid adenoma becoming a cyst, due to the coalescence of a number of colloid acini, and the degeneration of the colloid material, without any evidence of hemorrhage. This case is our best example of a cyst of this character.

FIGURE 8.—Photograph of alcohol specimen. Case III. Pedunculated colloid cyst arising from isthmus of normal thyroid gland. For microscopic picture, see Fig. 4.

CASE IV. PATH. NO. 5066. White female, unmarried, aged thirty-one. The tumor has been present twenty years, since eleven years of age. It has grown very slowly, and the last few years no growth has been observed. There were no symptoms except tumor. The spherical mass extends between the thyroid cartilage and suprasternal notch, it moves slightly, if at all, with deglutition. On palpation there is fluctuation. At operation, the cyst was enucleated, and the thyroid gland was not exposed during dissection. Figure 9 (*a* and *b*). are photographs of the alcohol specimen, (*a*) of the outer surface of the tumor, and (*b*) of the gross section. The capsule was smooth and white, and no thyroid tissue could be found attached to it. The tumor contained a clear fluid, similar to that in Case III, and within the fibrous capsule there was a zone of hemorrhagic, colloid thyroid material. The microscopic section differs from that in Case III (Fig. 4) only in the presence of numerous areas of hemorrhage. There is no young thyroid tissue; there is, perhaps, more stroma than in Case III. It is quite possible that this tumor for many years was a solid colloid adenoma of aberrant thyroid tissue. The presence of hemorrhage within colloid alveoli and in the stroma suggests that this hemorrhage was the etiological factor in the formation of the cyst, but the original hemorrhagic fluid within the cyst has all disappeared except the serum. Other observations seem to indicate this possibility. In the rapidly growing cystic tumors we usually find hemorrhagic contents, while in tumors which have been quiescent for some time, the evidence of hemorrhage has disappeared.

MULTIPLE CYSTS OF THE THYROID GLAND

In two cases there were single cysts in each lobe; in one case multiple cysts in the right lobe.

CASE V. PATH. NOS. 5571 and 5962. This patient was a white, unmarried female aged twenty-nine. At seventeen years of age, twelve years ago, a few months after beginning of menstruation, she observed the tumor now present in the left lobe of the thyroid. This tumor grew slowly for seven years, and she has observed no change in size for the last five years. The enlargement of the right lobe of the thyroid began five years ago; it increased more rapidly in size, is still growing, and is now much larger than the tumor in the left lobe. At

my first examination of this patient she complained of no symptoms except tumor. However, since both cysts have been removed, she informs me that she is very much less nervous, and is able to perform her duties as a saleswoman in a dry goods store very much better and with much less fatigue. At the examination (Fig. 10), the region of the right and left lobe of the thyroid is occupied by a symmetrical swelling somewhat egg-shaped, the right larger than the left. Both tumors are smooth and tense, and move with deglutition; both lie behind the sterno-cleido-mastoid muscle; in neither can fluctuation be obtained. There are no symptoms of pressure, nor of exophthalmic goitre. In view of the definite tumors in each lobe, with no communication with each other, a diagnosis of cyst, rather than simple goitre, was made. It is interesting to note that five years ago, with the appearance of the larger cyst in the right lobe, the patient suffered from epigastric pain, and two attacks of vomiting containing blood. The symptoms of indigestion and epigastric pain disappeared in one year. The probabilities are that there was no casual relation between the gastric ulcer and hemorrhagic cyst of the thyroid. At the first operation, in June, 1904, the tumor of the right lobe was removed, under cocaine. This tumor had, externally, almost the same appearance as a simple goitre, and it was removed in a similar manner, after ligation of the vessels outside the capsule. No thyroid tissue was seen, except during the division of the isthmus, and this appeared normal. The cyst, therefore, occupied the entire

FIGURE 9a.— } Photograph of alcohol specimen of a hem-
FIGURE 9b.— } orrhagic colloid thyroid cyst. Case IV.

right lobe, as will again be alluded to under gross pathology.

In December, 1904, about five months later, the tumor of the left lobe was explored under cocaine. In view of the fact that the entire right lobe had been removed at the first operation, I decided that it was necessary to demonstrate whether there was any thyroid tissue outside the cyst of the left lobe, so that the tumor was attacked in a different way from the method employed on the right side. The tumor was first exposed, and I found that there was normal thyroid tissue to the upper and outer pole of the cyst. After demonstrating this, I made an incision directly through the cyst wall. This wall was from two to three mm. in diameter, and the cyst contained a yellow fluid. Placing the fingers of the left hand within the cystic tumor, I found little difficulty in separating the wall of the cyst from the left lobe of the thyroid gland; only a few vessels required ligature. After the cyst was removed, this lobe of thyroid tissue was dislocated downwards, and to the medial side, and sutured in front of the trachea. I made this transplantation with the hope that there would be less deformity. The result has been most gratifying. Except for the transverse scar, the patient's neck has practically a normal appearance. At the present time (May, 1905), almost one year since the first operation, the young woman is in good health. As far as I can make out, there has been no change in the thyroid tissue left behind.

Pathology: The external appearance of the cyst of the right lobe (Fig. 11), differs from that of a simple goitre in that it is smooth, and shows no lobulations. During the operation this tumor was not cut into. It was composed of one large cavity, containing a very hemorrhagic degenerated colloid material; the wall of the cyst consisted, first, of a definite zone of connective tissue ½ mm. in diameter, within which there was a second zone 5 mm. to 1 cm. in thickness, of lobulated, soft, reddish and yellow tissue, resembling that of a simple goitre. The appearance of the open cyst is beautifully illustrated in the painting by Miss Hayes (Fig. 12), made within a few minutes after the tumor had been removed.

The gross appearance of the cyst of the left lobe (Fig. 13) differed externally from that of the right in the presence of two smooth lobules; on section the wall was a little thicker and more fibrous in character ; it contained, instead of a hemorrhagic colloid material, a cloudy, lemon-yellow, serous fluid; on the inner surface of the fibrous capsule there could be seen, here and there, only little islands of hemorrhagic, fleshy tissue. These areas varied from 1 to 2 mm. in thickness, and from 5 mm. to 1 cm. in diameter. In other places the inner wall appeared white and smooth, as if the connective tissue of the capsule were exposed.

Microscopic Study: The wall of the cyst in the right lobe (Fig. 14) is composed of an outer zone of loose lamellæ of connective tissue, between which there are sections of blood-vessels, and here and there a few colloid vesicles of thyroid tissue. Springing from this connective tissue zone there is a very cellular growth. The cells resemble the thyroid epithelium, and are arranged on a very fine connective tissue; there are numerous typical colloid vesicles, in which the colloid material shows some changes from normal. In other places the masses of cells have no colloid material within the connective tissue alveolus. In some areas there are groups of red blood cells mixed with the epithelial cells, or the colloid material. The connective tissue between the epithelial elements contains many vessels; some of the epithelial cells in the solid alveoli show degeneration.

Sections of the wall of the cyst in the left lobe show in some places concentric lamellæ of dense, fibrous tissue; vessels are scanty, only a few stained nuclei are seen, and there is no evidence of thyroid tissue. In a section through the wall covered with the red, fleshy

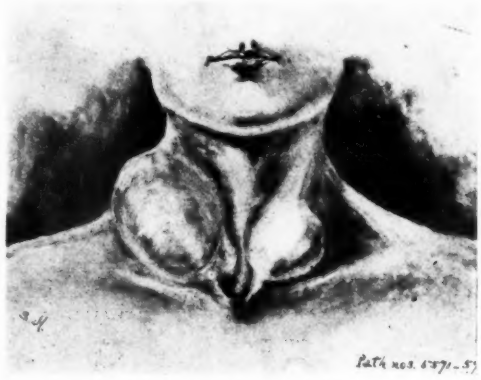

FIGURE 10.—Sketch of patient, case V.

tissue, mentioned in the gross description, there is thyroid tissue within the fibrous capsule. Colloid vesicles can be recognized, but both the central colloid material and the lining epithelial cell show evidence of degeneration. (See Fig. 23, micro-photograph, from case 14.)

Remarks: The observation in this case impresses me that we have a good example of hemorrhage as the etiological factor in the production of a thyroid cyst. In the smaller and older tumor of the left lobe, in which no growth had been observed for at least five years, we find no evidence of hemorrhage, and a thick connective tissue wall with but a trace of thyroid tissue; while in the larger, younger, and more rapidly growing cyst of the right lobe, we find evidence of recent hemorrhage in its contents, a good deal of thyroid tissue lining the wall, and in this tissue we find numerous vessels and evidence of hemorrhage.

In the right lobe the accumulating hemorrhagic contents of the cyst would probably, in the course of time, as in the left lobe, entirely destroy, by pressure, the thyroid tissue within the capsule. If the cyst in the left lobe had involved the entire gland, as in the right lobe, one could easily imagine that the disease would have produced myxœdema. This is, theoretically, possible, but, as a matter of fact, as far as I can ascertain, such a condition has never been observed.

FIGURE 11.—Sketch of fresh specimen, cyst of right lobe, case V.

The pathological findings in the right lobe in this case can be considered as an indication for the early removal of a thyroid cyst, and the findings in the left lobe indicate how a cyst can be removed with a perfect preservation of the surrounding thyroid tissue, provided the operation is performed before the cyst has destroyed, by pressure, this tissue.

CASE VI. PATH. NO. 5528. White female, aged thirty-six, married. This patient observed the enlargement of her thyroid gland sixteen years ago, when twenty years of age. Some time ago, not noted in history, one of the tumors had been aspirated, and fluid removed. Later the cyst was incised, and a seton introduced; following this unsurgical procedure, the patient was very ill with symptoms of local and general infection for six weeks. Fortunately, the wound healed. Recently the swelling has increased rather rapidly in size, and this local growth has been associated with shortness of breath, change in the voice, difficulty in swallowing, and rapid pulse. At the examination the patient is nervous, there is no exophthalmos or tremor, the voice is husky, palpitation of the heart is observed only on exertion, lateral pressure on the trachea causes dyspnœa. Both lobes of the thyroid contain smooth, tense tumors, the larger (8 by 6 by 4 cm.), on the left side, and the smaller (3 cm. in diameter), in the right lobe.

Figure 10 (Case V) would illustrate the external appearances if we reversed the tumors and made them both smaller. At the operation (by Dr. Halsted), the larger cyst, in the left lobe, was incised, and the contents evacuated, but its character not noted. There remained about this cyst some normal thyroid tissue. The smaller cyst in the left lobe was removed in the same way.

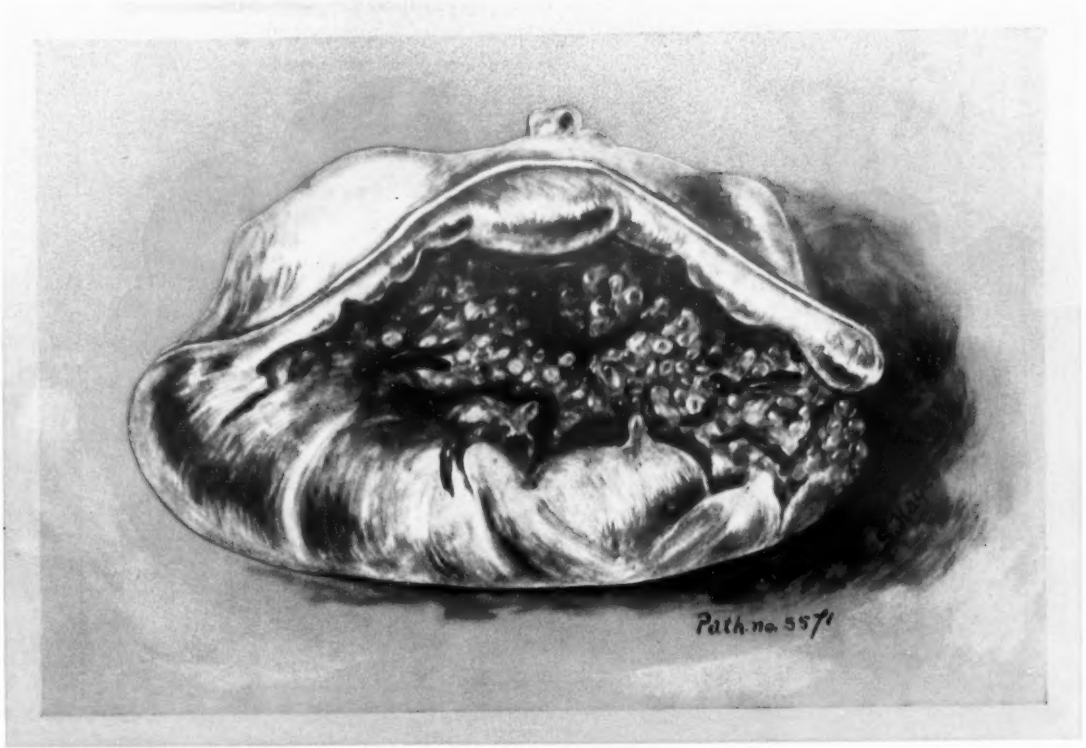

FIGURE 12.—Painting from fresh specimen; open cyst of right lobe, case V.

Pathology: The gross and microscopic pathology of these two cysts corresponds with the description of the cyst in the left lobe of Case V. (See Fig. 13.) The wall of the larger cyst, which had been opened and infected, shows areas of lymphoid-cell infiltration, and some areas of thyroid tissue, exhibiting the histological picture of chronic thyroiditis; springing from the wall of the larger cyst in a few places there were masses of fleshy thyroid tissue resembling in fresh and microscopic appearance that illustrated in Fig. 12.

FIGURE 13.—Sketch from fresh specimen open cyst of left lobe, case V.

Remarks: In this case the smaller cyst had shown no growth for years. The recent growth in the larger cyst, in which there was no evidence of recent hemorrhage, may have been due to the irritation of the seton, as this increase in size followed the healing of the wound. Pathologically, these two cysts represent what we may consider the end-result of a hemorrhagic cyst of the thyroid.

Growth in a thyroid cyst, due to the accumulation of a non-hemorrhagic fluid after hemorrhage has ceased, is possible. An illustration of this will be given later on.

CASE VII. PATH. NO. 175. This patient was a white male, sixty-five years of age. He observed a small lump in the right lobe of the thyroid about the size of a chestnut fifty-three years ago, when twelve years of age. Within five years the tumor reached the size of a hen's egg; in the remaining forty-eight years it has, perhaps, doubled its size. The patient is not certain whether there has been any increase in size for a number of years. There have been no symptoms except tumor. At the examination (Fig. 15), there is a smooth, spherical tumor occupying the position of the right lobe of the thyroid. The tumor, on palpation, was unusually hard. At operation there were two distinct cysts, the one shown in the photograph, and one which extended into the superior mediastinum. Both seemed to be outside the thyroid gland. The upper cyst was easily removed by enucleation, the lower cyst partially so, and the part remaining in the mediastinum was drained. The walls of both cysts consisted of lamellæ of thick fibrous tissue, attached to which, on the inner side, there were layers of organized fibrin, similar to that one sees on the inner wall of an aneurism. Both cysts were filled with old blood clot. There was no evidence of recent hemorrhage.

Microscopic section showed a wall composed of lamellæ of dense fibrous tissue with areas of hemorrhage; here and there an arrangement of the connective tissue suggesting the presence of thyroid alveoli, but no thyroid epithelium could be made out. On the inner surface of the fibrous wall there was organized blood clot. This patient has been observed for twelve years since operation. He is now seventy-seven years old; there has been no recurrence of the disease.

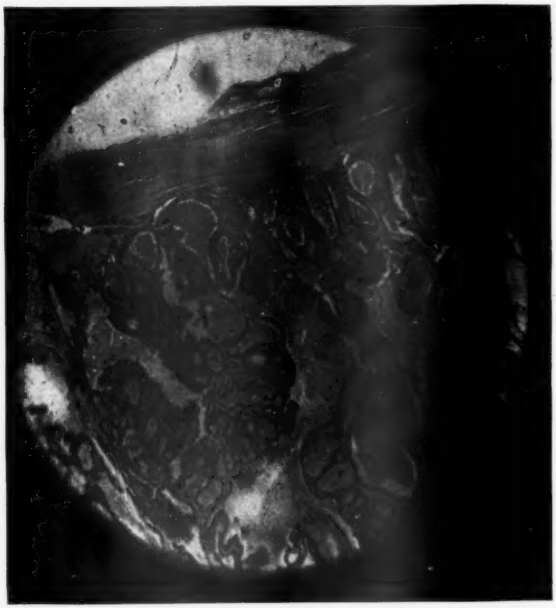

FIGURE 14.—Microphotograph from wall of cyst in right lobe, case V.

Remarks: This case represents a thyroid cyst of the longest duration, and the only one in which we have been unable to demonstrate thyroid tissue in or within the wall of the cyst.

FIGURE 15.—Photograph of patient in case VII.

CASE VIII. PATH. NO. 4140. White female, aged forty, married. This patient had been treated on the medical side three years previously for melancholia and angioneurotic œdema. These symptoms had been relieved after removal of a fibroid tumor. She sought the advice of the surgical clinic because of a tumor in the region of the left lobe of the thyroid, which had been observed one year. Although the entire thyroid was somewhat enlarged, there was a distinct small spherical tumor in the left lobe of the thyroid. At the operation, three small cysts

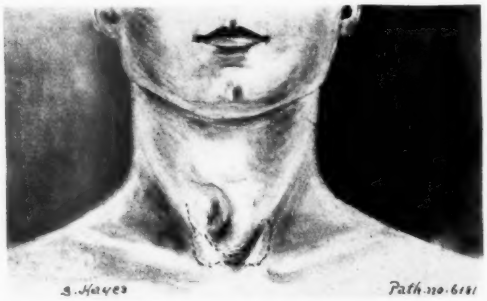

FIGURE 16.—Sketch of patient in case X.

FIGURE 17.—Sketch of fresh specimen, case X.

containing a brownish turbid fluid were removed by enucleation. Two of the cysts contained fluid only; no thyroid tissue could be recognized on the inner surface of the wall. In the third cyst there was some gelatinous fleshy tissue attached to the wall. The microscope demonstrated a histological picture of thyroid tissue showing chronic thyroiditis. (See Fig. 23, p. No. 6171.)

SINGLE CYSTS OF THE THYROID

In the remaining cases we have found a single cyst in the region of the right or left lobe within or without the tyroid tissue of the lobe. With few exceptions the cyst has been partly or completely surrounded by thyroid tissue. In some of these cases the entire lobe has been occupied by the cyst.

SINGLE CYSTS SITUATED OUTSIDE THE THYROID GLAND

CASE IX. SURG. NO. 520. This represents the first patient operated on in Dr. Halsted's clinic for a thyroid cyst, and, as there is no pathological study, we have to depend upon the clinical diagnosis.

The patient was a white male, twenty-five years of age. The tumor, in the region of the right lobe, had been present eight months, and there were no other symptoms. On palpation, there was distinct fluctuation. At operation, the cyst was removed easily by enucleation, and it is noted that it was situated outside the right lobe. I examined the patient eight years after the operation. The thyroid gland was not enlarged; there was no evidence of any trouble except the scar of the operation.

Remarks: In the region of the isthmus cysts outside of the thyroid gland tissue are common. Of our four cases all were situated above or below the isthmus. At first thought, one might conclude that these cysts were dilatations of the remains of the thyroglossus duct, but in two cases (see Figs. 8 and 9), the lining colloid, thyroid tissue within the cyst wall, conclusively proves that these cysts did not arise from the thyroglossus duct, but from aberrant thyroid gland tissue. It is quite possible, in cases 1 and 2, in which there is no pathological study, and in which the wall of the cyst was unusually thin, that the cysts may have originated from the thyroglossus duct. Unfortunately, all of our cases of lesions of the thyroglossus duct have been admitted to the clinic with a suppurating sinus, and we have observed no definite cysts similar to the one reported by Robinson in the Johns Hopkins Hospital Bulletin for April, 1902.

CASE X. PATH. NO. 6181. White female, aged nineteen. The tumor shown in Fig. 16, observed about eight months ago. It was first noticed shortly after unusual exertion, but there was no definite trauma. There have been no symptoms except tumor. In view of its position, which was

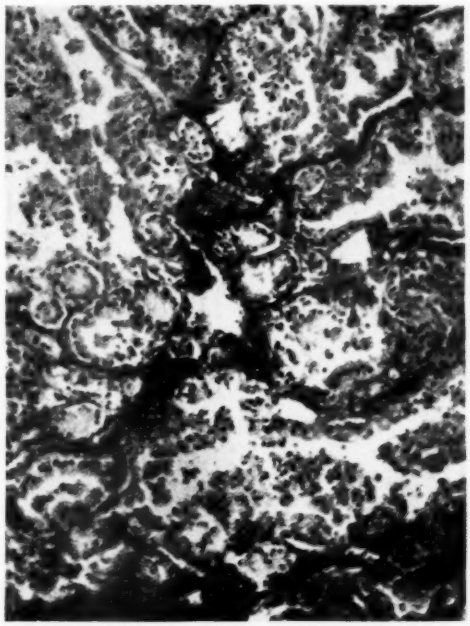

FIGURE 18.—Microphotograph, case X.

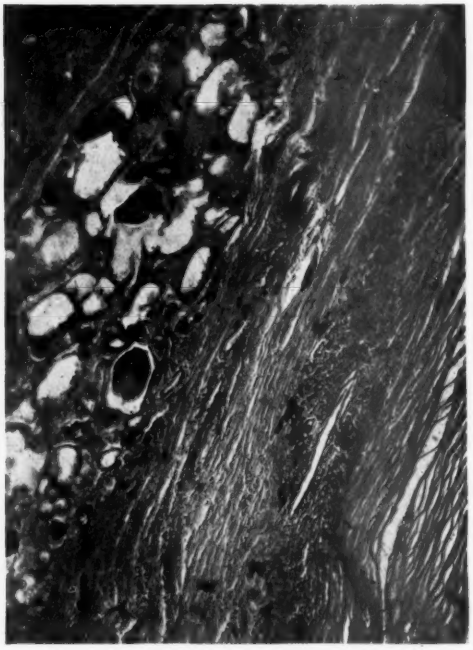

FIGURE 20.—Microphotograph, case XI.

above the lobe of the thyroid gland, and slightly behind the sterno-cleido-mastoid muscle, a clinical diagnosis of atheromatous cyst was made, although this is an unusually low position for this form of cyst. At the operation, this cyst was easily removed by enucleation. It was adherent to the upper pole of the right lobe of the thyroid gland.

Pathology: The cyst contained hemorrhagic material, and measured about 3 cm. in diameter. It had a distinct connective tissue capsule, and was lined by a thin zone of reddish, soft tissue resembling hemorrhagic thyroid tissue. A naked-eye diagnosis of a thyroid cyst was made from the appearance of the tissue lining the cyst wall. (Fig. 17.) The microscopic study (Fig. 18), demonstrates that the tissue within the fibrous capsule is composed of irregular alveoli lined and filled by epithelial cells of a much higher type than present in Fig. 14. Here and there we see a little degenerated colloid material, and everywhere there is evidence of hemorrhage; no normal thyroid tissue could be found. Many of the epithelial cells have desquamated and degenerated

SINGLE CYSTS WITHIN THE THYROID GLAND

CASE XI. PATH. NO. 5908. White female, aged forty-nine. This patient was referred to me by Dr. Bolgiano, of Baltimore. The tumor of the right lobe was first observed three years ago at about the beginning of the menopause. Menstruation ceased seven months ago. There have been no symptoms except tumor, and there has been no growth during the last year. The patient is married, and has had a number of children. At puberty, and with her pregnancies, she has never observed any enlargement of the thyroid gland. As the patient is a thin woman I am inclined to think such an enlargement would have been noticed. After the appearance of the tumor, she has suffered with severe headaches. These, it appears to me, can be now easily explained by the menopause rather than the cyst of the thyroid. On examination, one can see a smooth roundish tumor in the region of the right lobe of the thyroid, which moves with degutition. On palpation, the tumor is about 2 cm. in diameter, the portion presenting anteriorly is roundish, smooth, and tense; about the deeper portion one palpates the thyroid gland. In view of the age of the patient, and the rather small size of the tumor, I concluded that it would be better surgery to remove the entire right lobe with the tumor, as this procedure was not much more difficult than to cut into or enucleate it; that is, treat the tumor as a malignant neoplasm. In my second contribution, in the discussion of carcinoma of the thyroid, it will be clearly demonstrated that these malignant tumors of the thyroid must be removed before they have assumed characteristics which would allow a clinical diagnosis of carcinoma. For this reason in this case I preferred to remove the entire right lobe of the thyroid for a benign cyst rather than cut into a possible carcinoma. The operation was quickly and easily performed under ether anæsthesia; the patient had no complications, and at the present time, June, 1904, seven months since the operation, she is apparently well.

Pathology: Figure 19 (colored print), beautifully illustrates the entire right lobe of the thyroid before and after a hemisection. The cyst is partly buried in rather condensed thyroid tissue. It contained a brown-stained fluid, but no definite appearance of blood. The

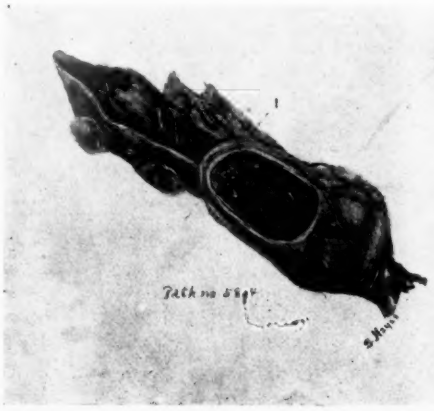

FIGURE 21.—Photograph of painting of tumor in case XI.

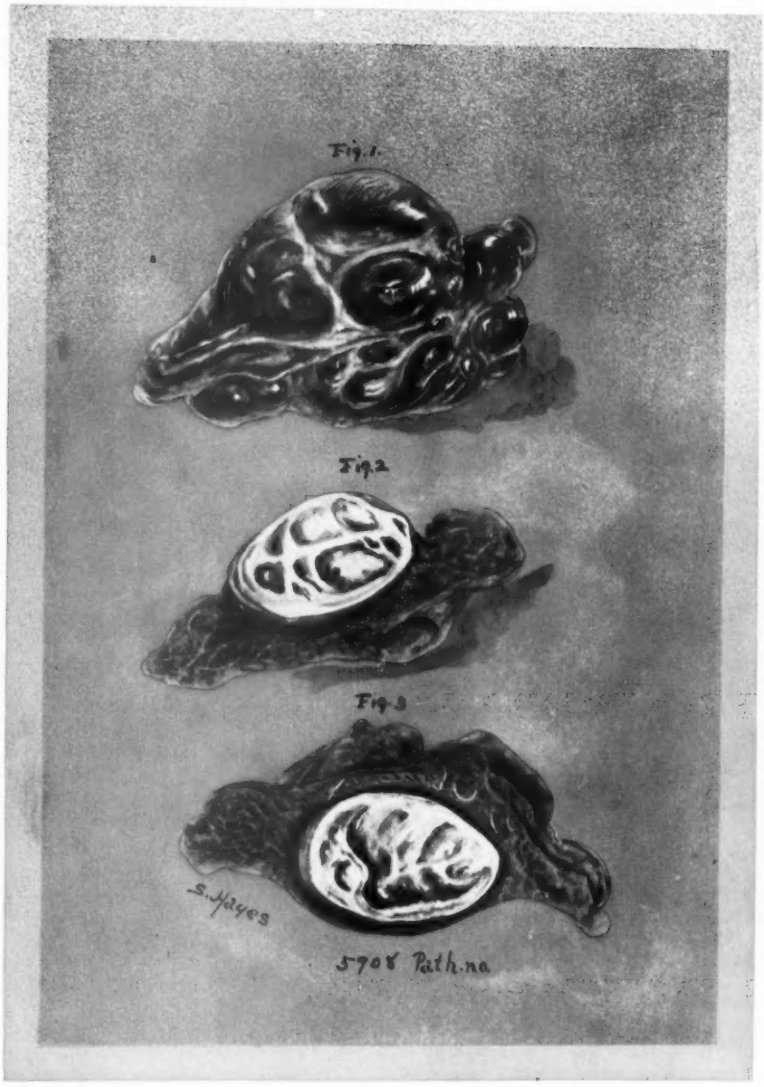

FIGURE 19.—Fresh specimen of thyroid gland in case XI, before and after hemisection.

outer wall is about 3 mm. in thickness, composed of a pearly white fibrous tissue which almost resembles hyaline cartilage. This larger cyst contains smaller cavities, and there are septa partly, but not completely, subdividing the larger cavity. All of these partitions are composed of the same material as the outer wall; in one or two of the smaller cysts there is colloid material.

Microscopic Study: Figure 20. The wall of the cyst is composed of lamellæ of dense connective tissue, in which, here and there, there are a few collections of

FIGURE 23.—Microphotograph, case XIV. Wall of cyst, chronic thyroiditis.

lymphoid cells; on the inner surface of the wall there are a few empty vesicles, and some containing colloid material, lined by thyroid epithelium, which takes the stain very faintly. In some places the epithelium is desquamated from the wall of the alveolus, in other places it is lost. Here and there, there is some evidence of hemorrhage; even in the microphotograph there is one area in which a number of vesicles are coalescing. That is, we have a picture of chronic thyroiditis with atrophy. This cyst corresponds in gross and microscopic pathology with that in Figure 13 (Case V), and demonstrates that this thick fibrous wall, with almost complete disappearance of the thyroid tissue, may take place in a small cyst of short duration. The wall of this small cyst is just as thick as in the large cyst, in Figure 13, which had been present twelve years.

CASE XII. PATH. NO. 5804. The position of the cyst and the clinical history in this case are almost identical with that in Case XI. The tumor had been present a few years in a woman over forty years of age. The operation was performed by Dr. Finney, and the cyst removed by enucleation, with a small amount of thyroid tissue attached here and there to the wall. The gross and microscopic appearance of the wall is identical with that in Case XI, except the cysts contained no partitions. The thyroid tissue attached to its wall showed slight chronic thyroiditis. Figure 21 is a photograph of a painting from the removed tumor. Figure 20, microphotograph of the wall in Case XI, will answer for the microscopic appearance of the wall of this cyst.

CASE XIII. I mention this case here because the tumor in the right lobe of the thyroid was about the same size and of the same appearance as the cystic tumors in the two previous cases. The patient, however, was a girl but fifteen years of age. When I saw this patient first, four and a half years ago, the tumor had been observed but two weeks. There were no symptoms except tumor. The remaining thyroid gland appeared normal. On account of the age of the patient, and the small size of the tumor, operation was not advised. The tumor disappeared in a year, and has not reappeared. I made a careful examination of this patient two weeks ago.

Remarks: These three cysts represent the smallest cystic tumors of the thyroid gland that we have observed. In Case XI, as the entire thyroid lobe was removed, we were able to demonstrate that there were no other cysts, and that the remaining portion, at least of this lobe, was normal. There were no areas of hemorrhage in the thyroid gland outside the cyst; that is, there is every reason to believe that the cysts were single in each case, and it is difficult to explain their origin as due to any diffuse lesion of the thyroid gland. Nor am I able to find any definite explanation. In this stage, and especially in the case in which we removed the entire thyroid lobe, the best opportunities were afforded for an investigation as to the etiology of the cyst.

In a recent communication by Mr. Faris, a student of my colleague, Dr. Cushing (the Johns Hopkins Hospital Bulletin, May, 1905, vol. xvi., p. 182), on thyroid cysts in dogs, they found in the opposite lobe numerous areas of hemorrhage, which, later, might have produced hemorrhagic cysts. In none of our cases have I been able to demonstrate a similar finding.

CASE XIV. PATH. NO. 6171. This case is of unusual interest. The specimen was sent to me by Dr. Kirby, of the St. Joseph's Hospital of Baltimore. The patient was a white female, fifty-three years of

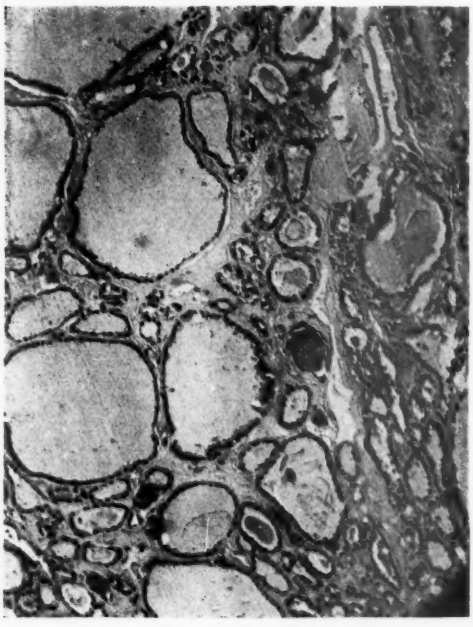

FIGURE 24*a*.—(Microphotograph, case XV.) Colloid vesicles, slight chronic thyroiditis.

age. She had observed a very small enlargement of the right lobe for twenty years. Coincident with the menopause three years ago the tumor grew rapidly, and recently there have been pressure symptoms. The appearance of the tumor, according to Dr. Kirby, was similar to that in the right lobe of Fig. 10 (Case V); the tumor was larger. It was removed under cocaine in the same way, and involved also the entire right lobe. There was very little thyroid tissue when he divided the isthmus; the left lobe of the thyroid was not exposed. On palpation it was apparently normal. The patient made a good recovery, and was immediately relieved of pressure symptoms. The external appearance (Fig. 22, *a*, *b*, colored plate) is practically identical with that in Fig. 11; the cyst contained a clear serum; the wall and the lining of this cyst, however, did not correspond with the cyst of the right lobe in Case V (Fig. 11), but with that of the older cyst in the left lobe (Fig. 13), and is illustrated in Fig. 22 (colored print). The small areas of thyroid tissue within the wall are a beautiful histological picture of chronic thyroiditis (Fig. 23). You can see in the microphotograph the degenerated and desquamated epithelium mixed with the colloid material.

Remarks: If hemorrhage was the primary cause of this tumor twenty years ago, we have no positive evidence that hemorrhage was the etiological factor of the recent rapid distention of this cyst which now occupies the entire right lobe, and, as will be discussed later on, it is difficult to explain all of these cysts by hemorrhage. In fact, I am more impressed with the possibility that hemorrhage is often a secondary process, and not the primary cause.

CASE XV. PATH. NO. 5125. Clinically and pathologically the large cyst of the right lobe in this case is very much like the one just described in Case XIV. The patient, however, was younger (37 years of age); the tumor had been present fifteen years, it was first observed one year before marriage, and with two succeeding pregnancies increase in growth was distinctly noted; then, there was apparently cessation of growth for a few years; during the last year it has grown rapidly, and there have been pressure symptoms. The cyst involved the entire right lobe. In Fig. 24*a*, a microphotograph of the thyroid tissue within the wall, the evidence of chronic thyroiditis is less than in Fig. 23. In this case the zone of thyroid tissue within the fibrous capsule of the cyst was much thicker than in Case XIV (Fig. 22*b*). (See Fig. 25, photograph of the alcohol specimen.) Within the zone of thyroid tissue lining the cyst there was a zone of organized blood clot in which very little thyroid epithelium can be seen (Fig. 24*b*).

FIGURE 24*b*.—(Microphotograph, case XV.) Chronic thyroiditis with atrophy of epithelial vesicles, organization of hemorrhage.

FIGURE 26.—Painting from fresh specimen; open cyst in case XVI.

CASE XI. PATH. NO. 5934. This case is of interest on account of the peculiar histological appearance of the thyroid tissue within the wall of the thyroid cyst. It resembles the type of fetal adenoma more than any other thyroid cyst in our observations. The patient was a white female fifty-two years of age. The tumor of the thyroid gland was first observed ten years ago, when she was passing through the menopause; previous to this period, she had never observed any swelling in the region of the thyroid gland. The tumor was first observed on the right side, and during the first year after its appearance the patient was nervous and had attacks of vomiting and vertigo. It is interesting to note that the tumor has changed in size, and the patient is quite positive that when the tumor is tense she is more nervous and suffers with vertigo and ringing in the ears At the examination, although the patient was nervous and excitable, and there was a slight tremor, there was no exophthalmos, and but slight tachycardia (100–110); the tumor involved the right lateral lobe of the thyroid and extended from the thyroid cartilage to the sternal notch; it was smooth and tense, freely movable, moved up with deglutition, and there was slight fluctuation. At the operation by Dr. Halsted, there was little difficulty in enucleating the cyst from the thyroid gland. The thyroid gland was apparently normal. The cyst contained a straw-colored, thin fluid; the fibrous wall of the cyst was similar in appearance to Figs. 22, 11, 19, and 17. The appearance of the surface of the cyst is beautifully illustrated in the colored painting by Miss Hayes (Fig. 26), and we see, as in the cases just referred to, the white connective tissue surface of the cyst wall and the areas of red, fleshy thyroid tissue attached to the wall. On the whole, there is much more thyroid tissue than in Fig. 22, but much less than in Fig. 11, while in Fig. 19 hardly any is to be recognized with the naked eye. On the whole, the appearance of this cyst resembled Fig. 17 more than any other. Yet, when we come to study the microscopic appearance of this fleshy thyroid tissue, it differs from that of any other cyst yet described. Figs. 27, (*a*, *b*, *c*, *d*) are microphotographs of the entire wall of the cyst. In *a* the fibrous capsule and the beginning of the thyroid tissue are shown, while in *d* the inner surface is illustrated; in the fibrous capsule, composed of lamellæ of loose connective tissue, we see in the spaces between the connective tissue areas of lymphoid cells and areas of cells resembling thyroid epithelium; here and there a few somewhat changed colloid epithelial vesicles; the thyroid tissue within the fibrous capsule is composed chiefly of alveoli lined or filled with epithelial cells. that is, an alveolus resembling the fetal type, but the cell resembles the typical glandular cell of the thyroid, while the cell of the fetal adenoma is smaller (see Fig. 2); the cell, however, is not as large as that observed in typical exophthalmic hypertrophy (see Fig. 6). In the thyroid tissue near the capsule, the stroma is scanty and the alveolus is usually lined with a single layer of epithelial cells, here and there we see a colloid vesicle (Fig. 27*b*). As we approach the inner surface of the thyroid tissue the connective tissue between the epithelial alveoli increases, the cells in the alveolus lose their definite arrangement, and are apt to lie loose, and have the appearance of degeneration; the evidence of degeneration and desquamation of the epithelial cell increases as we approach the inner surface (Fig. 27*c*); on the surface itself there is a mass of degenerated material in which here and there we can recognize remains of an epithelial alveolus (Fig. 27*d*). I find in the study of many sections no evidence of recent or old hemorrhage. There are areas, especially in Fig. 27*a*, which Ehrhardt (Beitraege zur klin. Chir., 1902, vol. xxxv, p. 5, 343) would call adenocarcinoma. This will be discussed in the second communication.

FIGURE 25.—Photograph of alcohol specimen in case XV, showing inner surface of cyst cut open.

This patient has been completely relieved of her symptoms since the operation about one year age.

THYROID CYSTS IN WHICH THE THYROID TISSUE WITHIN THE WALL SHOWS THE HISTOLOGICAL APPEARANCE OF EXOPHTHALMIC HYPERTROPHY.

CASE XVII. PATH. NO. 5216. In this patient, a clinical diagnosis of exophthalmic goitre was made. The patient was a white female, forty-two years of age; she had married at twenty-five, but had no children. With the onset of menopause, three and a half years ago, she observed a swelling in the region of the left lobe of the thyroid; shortly after the appearance of this tumor, all the symptoms of exophthalmic goitre except the exophthalmos were observed. The first symptoms to appear were nervousness and tremor; attack of nausea, vomiting and diarrhœa; tachy-

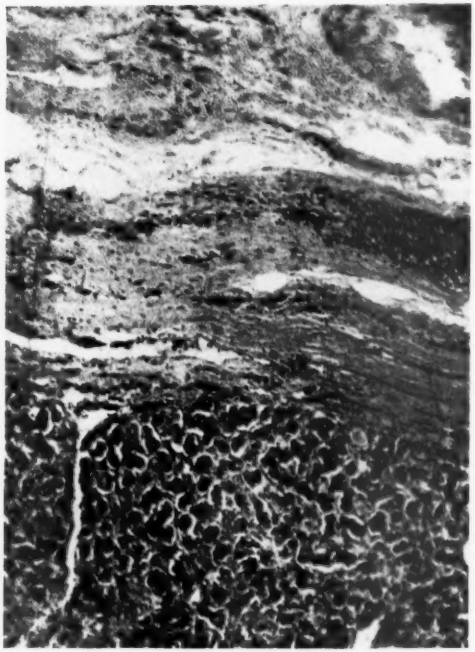

FIGURE 27*a*.

cardia has been observed definitely only two months, and this symptom began after the patient had been given thyroid extract. From the onset of the disease she had been under good medical treatment. At the examination the patient was nervous, there was slight tremor, the pulse varied from 100 to 144; hæmoglobin 70 per cent, no exophthalmos; the tumor occupied the left lobe extending to the isthmus of the thyroid; it was smooth; there was no enlargement of the right lobe. At the operation by Dr. Halsted, the entire left lobe of the thyroid was excised under cocaine anæsthesia. The patient has been completely relieved of her symptoms since operation, about eighteen months ago.

Pathology: Fig. 28 is a sketch of the alcohol specimen showing the smooth surface of the outer wall, the thick zone of thyroid tissue surrounding the cavity which occupied the entire left lobe. Unfortunately there was no note on the contents of the cyst, and I saw the specimen only after it had been placed in alcohol. The appearance of the thyroid tissue lining the cyst resembles more closely the appearance of the alcohol preparations of exophthalmic goitre than any of the other cysts, and under the microscope we find definite histological appearances that resemble those observed in the thyroid of exophthalmic goitre. (See Fig. 29. Compare this microphotograph with Figs. 5 and 6.) In some areas in the cyst wall there are colloid vesicles; the colloid material is, however, undergoing degeneration, and the epithelial cell shows changes. (Fig. 30.) You will note at once that the type of the epithelial cell and its arrangement within the alveolus in Fig. 29 is different from that described in any previous thyroid cyst. In Fig. 18 (Case X) the epithelial cell is somewhat of the same type, but the proliferating cells within the alveolus do not assume the same combination; in Fig. 29 we have the appearance of an epithelial hypertrophy, while in Fig. 18, one of degeneration and desquamation.

CASE XVIII. PATH. NO. 5309. In this case the clinical symptoms of exophthalmic goitre were less distinct and the histological appearance of exophthalmic hypertrophy is not as marked as in Case 17. The patient was a white female, forty-two years of age, single, no children; she has always been nervous and on the least excitement suffers from palpitation of the heart. The patient was unaware of any thyroid enlargement until five years ago; the swelling increased in size very gradually, and during the last year she has observed no growth; the patient is inclined to think that she has been more nervous since the tumor appeared. The tumor which occupied the right lobe was the size of a small orange, and extended across the isthmus to the left lobe; it was globular in form, tense, slight fluctuation; it moved with deglutition. The patient had slight tachycardia (90–110), there was no tremor, the eyes, perhaps, were

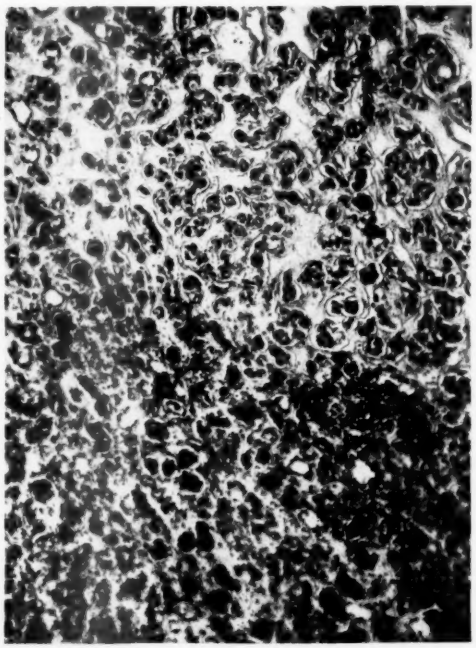

FIGURE 27*b*.

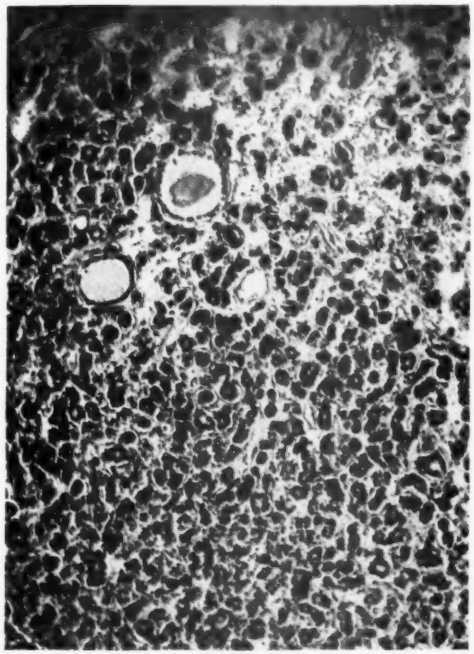

FIGURE 27*c*.

a little prominent. At the operation by Dr. Halsted, under cocaine anæsthesia, the cyst was opened; it contained a brownish fluid material; the cyst apparently occupied the entire right lobe, which was removed; the appearance of the cyst is well illustrated in Fig. 13, in Case V. On the whole, there was more thyroid tissue adherent to the connective tissue capsule; in the fluid contents there were found red blood cells, leukocytes, and cholesterin crystals.

Fig. 31 is a microphotograph of a section of the wall of the cyst in which the evidence of exophthalmic hypertrophy is most pronounced (at x); in the majority of places, however, the thyroid vesicles resemble those observed in Case XVI, Fig. 27*a*; in other places there are typical colloid vesicles with areas of hemorrhage within the vesicles and in the stroma, an appearance illustrated in Fig. 24, except in this case there was very much more hemorrhage; within and outside of the fibrous capsule of the cyst, there were areas of normal thyroid tissue.

Remarks: In the histological study of the wall of this cyst, we find a very complex picture: normal thyroid tissue within and outside the capsule, areas of colloid epithelial vesicles with evidence of hemorrhage, areas of compressed epithelial vesicles similar to Case XVI, Fig. 27, and here and there areas of exophthalmic hypertrophy not quite as advanced as that shown in Fig. 29. This case, therefore, illustrates the rule in the histological appearance of the thyroid tissue within the fibrous capsule of the thyroid cyst, that is, there is no uniform histological picture, it varies with different cysts, and varies in different parts of the same cyst; in some cysts the colloid vesicle is pretty well preserved, in others we have compressed alveolus with the abscence of colloid, like fetal adenoma; in others an increase of stroma with changes in the colloid material and degeneration and desquamation of the epithelial cell, that is, the picture of chronic thyroiditis; in a few focal areas of exophthalmic hypertrophy. It is interesting to note that so far, in our observations, the patient who exhibited symptoms most closely analogous to exophthalmic goitre, had a thyroid cyst in which the thyroid tissue within the wall showed more areas resembling exophthalmic hypertrophy than in any other case. (Case XVII.)

FIGURES 27*a*, 27*b*, 27*c*, 27*d*.—Microphotographs from wall of cyst in case XVI.

CASE XIX. PATH. NO. 4401. This case is of interest, because the right lobe of the thyroid contained multiple adenomata and one cyst. The left lobe was normal. The patient exhibited atypical symptoms of Graves' disease.

The patient was a white female, forty-nine years of age; she had been married twice, once at the age of twenty-seven and again at the age of forty-three; with each marriage there had been one healthy child. There is no note on the history with regard to the menopause. Two and a half months before she was admitted to the clinic, the patient began to be troubled with a cough, and at the same time observed an enlargement of the right side of the neck. One month later she began to have attacks of palpitation of the heart and shortly after this noticed prominence of the eyes. She has always been nervous, but thinks that since the appearance of the tumor, she has been more so. At the examination, the eyes were but slightly prominent, there were no other eye symptoms, there was slight tremor of the hands and fingers and slight palpitation. The tumor, 5 by 7 cm., involved the right lobe of the thyroid. At operation the entire right lobe was removed under cocaine anæsthesia, the left lobe was apparently normal. The tumor received in the laboratory measured 10 by 6 by 2 cm.; it consisted of three distinct masses inclosed within one capsule. On section (Fig. 32), the larger mass is a cyst filled with brownish red material, and lined by an irregular zone of thyroid tissue; this hemorrhagic thyroid tissue has distinct gelatinous areas; the two smaller tumors have the usual spongy appearance of a simple goitre. The tissue outside these three tumors is a mixture of fibrous tissue, and apparently normal thyroid tissue. The microscopic study demonstrates that the wall of the cyst and the solid tumors have the appearance of a simple colloid adenoma well illustrated in Fig. 24*a* (Case 15). There are some areas of young thyroid tissue, and here and there proliferation of the cell from the colloid alveolus, and

FIGURE 28.—Sketch of alcohol specimen, cyst in case XVII.

now and then an invagination which indicate focal areas of early thyroid hypertrophy.

Remarks: Unfortunately, we have not heard from this patient since the operation, and for this reason, are unable to state whether the symptoms were relieved by the removal of the right lobe of the thyroid.

CONCLUSIONS

It is unnecessary to discuss the remaining five cases of the twenty-four thyroid cysts: they would fall in one or the other of the groups already discussed. I am unable, from this study, to come to any positive conclusion with regard to the etiology of these cysts. I am not at all impressed with the usual conclusion that hemorrhage is the primary etiological factor. In many of our cases the histological evidence of hemorrhage is absent, while, on the other hand, the evidence of hemorrhage in simple goitre without cyst formation is much more common. It would seem strange if hemorrhage were an important etiological factor, that cysts were not more common in simple goitre. In the hypertrophy observed in Graves' disease the vascularity of the stroma is apparently greatly increased, yet, as a matter of fact, hemorrhage is uncommon, and we have never observed a hemorrhagic cyst in a diffuse exophthalmic hypertrophy. Cysts of the thyroid occur at any age, they are usually single; they are found within the lobe or isthmus, or they may be situated outside the thyroid gland. The rapidity of growth varies with individual cases; if situated within a lobe, as a rule, in time the cyst involves the entire lobe; the capsule of the lobe becomes the capsule of the cyst; within this capsule the amount of thyroid tissue varies. I am more impressed with the conclusion that it is more easy to explain the origin of the thyroid cyst on the basis of a solid adenoma. This encapsulated tumor may be present within or without the thyroid gland. In its growth, the central dilated colloid alveoli coalesce

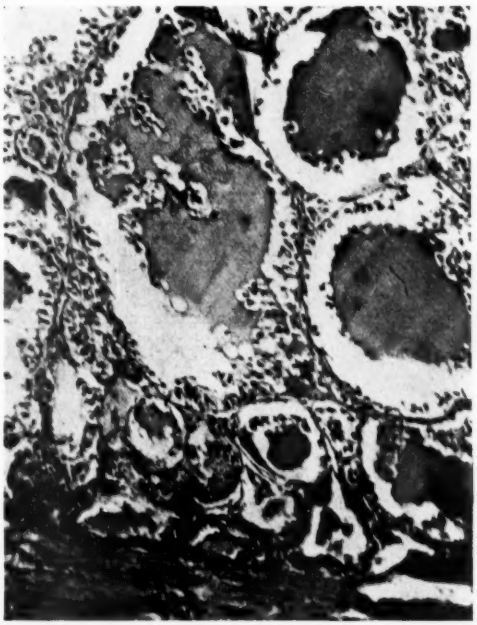

FIGURE 30.—Microphotograph from wall of cyst in case XVII, showing chronic thyroiditis.

FIGURE 29.—Microphotograph from wall of cyst in case XVII, showing areas of thyroid hypertrophy.

FIGURE 31.—Microphotograph from wall of cyst in case XVIII, showing focal areas of hypertrophy.

and form a cavity due to the degeneration of the colloid material and lining epithelial cells. Such an instance is well illustrated in Case III (Fig. 8); here there is absolutely no evidence of hemorrhage, and the tumor differs from a simple colloid adenoma only in the presence of its central cavity. In other cases hemorrhage apparently takes place into the original non-hemorrhagic cavity and may explain the rapid enlargement of the tumor. Such an instance is illustrated in Case V (Fig. 11), or Case X (Fig. 17). In other instances, however, the recent rapid growth is not associated with any evidence of hemorrhage, Case XIV (Fig. 22). It would be very difficult to explain the origin of the cyst in Case XI (Fig. 19) as due to hemorrhage. This in addition, is our most beautiful example of a small cyst situated within a lobe of the thyroid gland in which the surrounding thyroid tissue shows no changes. We could easily imagine in this case how, if the cyst grew rapidly, the surrounding thyroid tissue might completely disappear owing to pressure, similar to that observed in Case V (Fig. 11) and Case XIV (Fig. 22). In these cases we usually find within the lamellæ of fibrous tissue forming the wall of the cyst, evidence of thyroid gland tissue. In some cases the cyst may reach considerable size, and yet there may remain outside the cyst wall, a large portion of unaffected thyroid tissue, as illustrated in Case V (Fig. 13), the smaller cyst of the left lobe.

The histological appearance of the thyroid tissue within the wall of the cyst varied. The change as a rule, it seems to me, can be explained by the result of pressure. This zone of thyroid tissue, if the tumor is growing, is compressed between the contents and the fibrous capsule. In some instances this pressure is slight, if any, and we observe pretty normal thyroid tissue, except that there is increase of the colloid material in the vesicle, as illustrated in Case III (Fig. 4). Chronic thyroiditis is the most common histological change as illustrated in Fig. 23 (Case XIV). In other cases the pressure has apparently chiefly produced absorption of the colloid within the epithelial alveolus (Case XVI, Fig. 27).

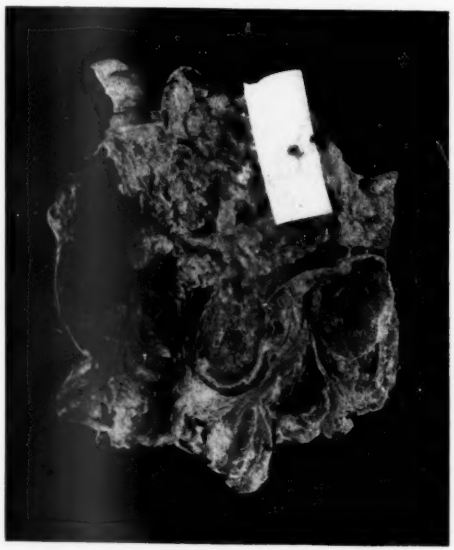

FIGURE 32.—Photograph of section through alcohol specimen, case XIX.

As we know at present very little concerning the etiology of thyroid hypertrophy, we cannot explain the cases in which we have observed this hypertrophy in the wall of the cyst.

The histological changes in all diseases of the thyroid gland are by no means settled, and there are many interesting problems not only of pathology, but of physiological chemistry for investigation. From the standpoint of practical surgery, our present knowledge of thyroid cysts is sufficient to indicate rational treatment. These tumors should be removed. As a rule, the operation is one of slight difficulty. In many cases, especially if the cyst is small, it can be opened and enucleated from the surrounding thyroid tissue without difficulty. When the cyst involves the entire lobe of the thyroid it should be attacked and removed in the same way that the enlarged lobe of a simple goitre is extirpated. There have been no mortality and no serious post-operative complications in this group of cases, and so far, no recurrent cyst in the remaining thyroid tissue.

SPINA BIFIDA, WITH A REPORT OF THREE HUNDRED AND EIGHTY-FIVE CASES TREATED BY EXCISION[1]

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SINCE it is impossible for one person to have large enough experience in this comparatively rare affliction to enable him to speak authoritatively upon the subject, I thought it might be helpful to collect as many cases from literature as possible. To that end I offer to-day an analysis of all the cases treated by operation and on file in the Index Catalogue of the library of the Surgeon General's Office in Washington, both printed and in supplementary cards. These reports are from every civilized people on the globe. They begin with a case reported by an American surgeon, H. H. Sherwood, in 1813, and end with cases reported in 1905. There were sixty-seven articles with report of cases by injection of iodine, but this treatment has been practically abandoned as dangerous and unsurgical. There are one hundred and ninety articles in which three hundred and seventy-eight cases treated by excision are reported. Although a few cases are reported in which the tumor appeared after birth, it is evident that the bony defect was congenital and from causes unknown. In this series the sex of the patient was mentioned but two hundred times, and of these there were ninety-eight males and one hundred and two females.

The diagnosis presents no difficulty except in certain cases of spina bifida occulta. I recently examined a woman twenty-four years old who walked with a gait resembling that of a patient with a very mild form of spastic paralysis. She was very nervous and hysterical and subject to severe headache and backache. Upon examining her spine my attention was attracted by a heavy growth of black hair over the lumbar region, which is quite characteristic of spina bifida occulta. There was no tumor, but by careful palpation a defect could be detected in the spine which established the diagnosis. A few of these cases have been operated upon on account of severe pain. Fibrous bands have been found pressing upon the cord, and their removal has resulted in relief from pain. Theoretically, only meningoceles and select cases of meningo-myelocoles should be operated upon, but practically it is often impossible to tell the variety before operation. Paralysis and atrophy of lower extremities and lack of control of the sphincters indicate the graver forms.

Analysis of the cases here collected gives us a different result concerning the relative frequency in different localities from that which has obtained in literature heretofore. Twenty-three per cent were sacral, thirty-four per cent lumbar, twenty-nine per cent lumbo-sacral, four and a half per cent dorsal, nine and a half per cent cervical, and two cases were occipital.

[1] Read before the American Surgical Association at San Francisco, July 6, 1905.

The prognosis in spina bifida without operation, except in cases where the tumor is very small and well covered, is hopeless in the extreme. A very large percentage of them die early from leakage of cerebro-spinal fluid and meningitis. The prognosis with operation is not so good as we could wish. The prognosis both as to mortality and to end results naturally varies with the character of the tumor, the age of the patient, and the operation. In large-sized tumors with thin septic coverings and complicating hydrocephalus, in all cases of myelocele and in most cases of meningomyelocele with paralytic complications, the danger of death following operation is great, and the end results are unsatisfactory.

In the cases reported in this paper, there were twenty-three per cent of complications quite evenly divided between paralysis, clubfoot, and hydrocephalus, and in many cases all of these complications were present. In one single case the clubfoot was reported improved, in one case incontinence was reported cured, and in two cases improved, but in all other cases there was absolutely no improvement. To counterbalance this one case cured and three improved, several cases of paresis and incontinence developed following the operation, presumably due to injury to the nerves or cord.

The age at which the operation was performed showed the most decided bearing upon the mortality. Of those operated upon within the first few months of life the mortality was over thirty-five per cent, while in those operated upon when five or more years old the mortality was but four and seven-tenths per cent. Of course, this difference can be largely accounted for from the fact that the patients living five years or more were not bad cases and were good subjects for operation, but it raises the question whether it is really worth while to operate upon these patients early.

In 1895 Hanssen (1) reported one hundred and fifty cases from literature treated by excision during the aseptic period with twenty-seven per cent mortality.

In the cases here reported the average mortality was twenty-seven per cent. In those operated before 1885 the mortality was thirty per cent, and in those operated during and after 1885, the mortality was but twenty-four per cent. There was a reported mortality of seven per cent within three months after operation, which would make the real average mortality about thirty-five per cent. If all cases had been followed and reported the probability is that the mortality at the time of and a few months subsequent to operation, would be fully fifty per cent.

Bayer, whose writings upon this subject occupy a prominent place in literature, in 1892 (2) reported fourteen cases and claimed that surgical interference was admissible even in cases where the filum terminale of the cord and nerves are attached to the sac wall, because they can be successfully dissected off and returned to the canal, and in paralytic cases because they are otherwise doomed to die of meningitis; but in 1897 (3) he reports three additional cases and concludes that fifty-nine per cent of patients operated upon for spina bifida will die sooner or later, and he will operate in future under the following conditions only: 1. When there is no decided hydrocephalus; 2. When there is no paralysis; 3. When clinically no complications are to be expected in the sac.

In 1893 Hildebrand (4) reports thirteen cases operated on in Konig's clinic, and concludes that most myeloceles and meningomyeloceles and cases complicated by irreparable deformities and severe paralysis should not be operated upon.

Sachtlaben, in 1902, (5) reports thirty cases of spina bifida occurring in Mikulicz's clinic, of which eighteen were operated upon. Of these eighteen, six died and twelve were locally cured, but only five completely cured. Of the twelve cured locally, six died between three and one-half months and one year after operation. These were the cases complicated with paralysis or hydrocephalus. The five permanently cured were simple meningoceles. Final results were satisfactory in only 38.9 per cent of the operated cases.

Broca (6) in 1895 reports several cases, and concludes that operation is not advisable.

Mayo Robson, in 1895, (7) reports twenty operations with a mortality of thirty per cent. He advised operation in all cases except where the tumor is so small that operation is evident-

ly not needed, and where there is a large fissure, marked hydrocephalus, and paralysis.

My personal experience is limited to seven operations with one death. Six of my patients were select cases in which the coverings were intact, complications absent or very mild, and the child old enough and well enough to give promise of future usefulness. The one death was in a patient four months old, with a very large tumor with septic covering. It did well for a few days and then died of meningitis.

The causes of death following operation most frequently mentioned are, shock, convulsions, meningitis, hydrocephalus, and late infections. The accidents during operation were very few. Hemorrhage is not mentioned. Early operators were very careful to avoid a sudden outlet of cerebro-spinal fluid, but later operators have frequently made free incision into the sac with no noticeable bad effect. In one of my cases the patient was lying prone with the hips elevated when a large quantity of liquid escaped suddenly, without perceptible effect upon either pulse or respiration. As a rule the nerve filaments attached to the sac have been dissected off and returned to the canal, or when this was impossible, the meninges were returned with the nerves. In numerous instances the nerves were removed with no noticeable effect. In one of Cockburn's cases, reported in the *American Journal of the Medical Sciences*, "three-fourths of an inch of the cauda equina was cut off because it could not be returned," without bad results. In this case there was general incontinence before the operation, but after seven years, the reporter informs me, the only defect is a partial paralysis of the sphincter ani which is noticeable only when the boy is suffering from diarrhoea. Death during operation occurred very seldom. The anæsthetic most frequently mentioned was chloroform, but the reports on this point were very meager.

The mechanical principles of the operation have been the same from the first, but changes in the operative technic have been made by the adoption of absorbable buried sutures and modern aseptic methods. A number of surgeons have attempted to fill the bony defect in the canal by the implantation of bone from animals but without success.

Bobroff (8) filled the gap with bone successfully by taking a bony flap from the iliac crest, preserving its circulation through its attachment to the soft parts.

Zenenko (9) recommends the filling of the bony gap by taking bone from the remains of the sacral arches and the tuberosities of the posterior surface of the sacrum. The bone-flap method has been quite commonly employed by Russian surgeons, but the consensus of opinion is expressed by Bayer who says that the muscles and fascia are sufficient. Mikulicz obtained his lasting results without bony or muscular flaps. The bone-flap method adds materially to the danger of the operation, and experience teaches that it is not necessary because there is very little tendency to relapse. Very few relapses are reported following any of the various methods.

The only indications to be met in an operation for spina bifida are the removal of the sac and the closure of the cleft, and the simplest technic is the best.

The patient should be placed prone with the hips elevated. When there is an ulcerated septic surface it should be made sterile by repeated washings followed by ninety-five per cent carbolic acid and alcohol. When possible redundant skin flaps should be made so that they can be approximated without tension. The sac is next opened freely with knife or scissors. When the tumor is a simple meningocele it is dissected free down to the cleft with a knife and for a short distance within with a blunt instrument. It is then cut away, leaving enough to make ample meningeal flaps. When nerve filaments are present, it is customary to dissect them loose and return them, which is usually easy to accomplish. When, as sometimes happens, it is difficult to dissect the nerves from the meninges, it is the usual custom to return them together with the meninges within the cleft. In many cases reported the nerves could not be returned, or were removed without harm. The probability is that much time has been wasted preserving functionless nerve filaments. When they end in the sac it is difficult to understand how they can perform any function. The

meningeal opening is next closed with fine chromic catgut. The sac having been removed and the meningeal opening closed, flaps of muscle and fascia should be dissected from either side and brought together without tension by many chromic gut sutures. When the cleft is small very little, if any, dissecting is required, but when larger, it may be necessary to make a longitudinal incision on either side at some distance from the cleft, so that the flap can be slid toward the center. Finally, the integumentary flaps are united with silk, and an ample surgical dressing applied. In young children the wound should be protected from the urine and feces by a collodion dressing.

A careful study of these reported cases illustrating the experience of so many surgeons seems to justify the following conclusions:

1. Operation upon children of very tender age is scarcely worth while, because it is accompanied by so large a mortality rate, and because it does not stop the progress of progressing cases.

2. Patients five or more years old can be operated upon safely.

3. Patients with large or rapidly growing tumors, with hydrocephalus and with paralysis or deformities of the extremities are not cured.

Finally, all we can hope to accomplish by operation for spina bifida, is to relieve the patient of an unsightly and annoying tumor after he has survived the dangers of the affliction per se.

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THE STATUS LYMPHATICUS AND THE DUCTLESS GLANDS[1]

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THE term Status Lymphaticus comprises a somewhat complicated pathological condition, having very much to do with perverted function of the ductless glands and disturbances in normal proportion of the so-called internal secretions, which have much more than a remote interest for the surgeon, because they are so closely allied to disturbances of nutrition and innervation, and to overgrowth of certain parts of the body. Normal relations being so far out of adjustment, the resulting condition is one which often makes the administration of an anæsthetic dangerous and the performance of otherwise clearly indicated operations even inadvisable. It has much to do also with the matter of sudden death during and after operation. Turning attention for a moment to the matter of sudden deaths, which is of such overwhelming interest for the surgeon, one may say that they have, in times past, been usually attributed to the anæsthetic or the anæsthetist, while not enough attention has been given to lesions of the lymphatic and vascular systems. While at times disturbance of the circulatory and respiratory centers may be closely associated, there are other times when there seems to be but little relation between them; as is shown by the

[1] Read before the American Surgical Association, San Francisco, July 5, 1905.

fact that, at least in experimental animals, circulation may proceed regularly for a long time after respiration has ceased. A large proportion of cases of sudden death may be accounted for by such vascular disturbances as acute anæmia, fatty heart, rupture of vessels, syncope due to cardiac anæmia, disease of the coronary arteries, defective valves, endocarditis, etc. In the respiratory tract we may meet with pulmonary embolism, œdema, asphyxia from overloading of the left side of the heart and emphysema. Even the lesions attributed to the kidneys concern rather their vessels, and this may be true also of the nervous system. While all of these disturbances have more or less to do with the status lymphaticus, the latter is nevertheless a condition not yet widely appreciated, too often recognized only after the sudden death of its victim, and yet not so easily described or defined that it can, with certainty, be always recognized during life. It therefore demands careful study.

The fact that it has so much to do with the lymphatic system and the thymus necessarily calls attention to the functions of all of the temporary glands. Lymphoid tissue throughout the body seems to increase as the thymus diminishes, and it is quite likely that the former tissue assumes the work of the latter in the matter of regeneration and leucocytosis and the general growth of the body. Thus we find that in marasmus of the infant type the thymus has disappeared, and its condition is always a fair index as to the general nutrition of the infant. But it is not atrophy of the thymus that causes disturbance so much as it is hypertrophy; and the fact which is to us of the greatest interest in this connection is the liability to sudden death, during or after an anæsthetic, in cases where the thymus is enlarged. Between the pituitary body, the thymus, the thyroid, the coccygeal body (Luschka's gland), the testis, the ovaries and perhaps the bone marrow, there exist strange relationships which have not yet been sufficiently studied. Probably in this list, along with the thyroid, should be inserted the para-thyroids, i.e., those small bodies so often associated with the thyroid, sometimes imbedded in it, much as are the islands of Langerhans in the pancreas, so that when the thyroid is removed they go with it. In many animals, and usually in man, these little bodies are separate, and in the latter overlooked. Experimentation has shown that after removal of these, rather than of the thyroid, there appears the full train of symptoms, such as tetany, etc., which are included in the phenomena of experimental myxœdema. There can be no doubt that these small bodies are of different nature and function from those of the thyroid itself. This has led to the inference that some of them at least have really an anti-toxic function. Should this be demonstrated, the whole aspect in which we regard Graves' disease will be changed. Exophthalmic goitre used to be regarded as due to the overloading of the blood by degenerate products of a hypertrophied thyroid. These experiments raise the question of how many of these symptoms are due to excess of thyroid secretion and how many are due rather to atrophy of the parathyroids, since nearly all of the symptoms of Graves' disease follow extirpation of the latter. This theory is strengthened by the fact that in the ordinary forms of cystic goitre, where apparently thyroid secretion must be produced in excess, the symptoms of Graves' disease are lacking. Exophthalmic goitre is seen ten times as often in women as in men, while ordinary goitre affects both sexes alike. Moreover we may get all the signs of Graves' disease without enlargement of the thyroid, which, in these cases, seems to play little if any part. There is, therefore, much reason to argue that the thyroid is not the primary seat of the lesion of exopthalmic goitre, but is only secondarily involved, as, for instance, is the spleen in malaria.

It appears that when the thyroid is removed and the parathyroids remain, there follow myxœdema and cachexia, the very counterpart of Graves' disease, but that when the parathyroids are removed and the thyroid left there follow severe nervous symptoms quite like those of Graves' disease. There is, therefore, strong reason for believing the internal secretion of the thyroid proper to be intimately related to the nutrition of connective tissue, and that the mucoid infiltration of myxœdema is due to degeneration in the fibrous and connective textures.

With regard, next, to the internal secretions of the testis, we are again reminded that in some respects its structure and arrangement are quite similar to those of the pancreas, since between its tubules are met small collections of cells not so definitely grouped as in the pancreas, to which hitherto little attention has been paid. These are, in all probability, the agents which secrete some other material which has largely to do with the growth and development of the body. These are quite apart from the peculiar tubular structures concerned in the manufacture and collection of semen.

Moreover, the life history of the thymus is closely related to that of the testis; atrophy of the former depends on the complete maturation of the sexual organs. In the male guinea-pig removal of the thymus is followed by more rapid growth of testes, hence there appears reciprocal relationship between thymus and testis, each influencing the growth of the other. In females this does not seem to exist; removal of the thymus does not hasten the onset of maturity.

The testicles, then, have a well-marked triple function. (*a*) They produce a substance or stimulus that certainly influences development, especially in sexual characteristics. (*b*) They produce a substance apparently essential to the psychical manifestations of sexual activity. Although these functions are related, one is essentially developmental, while the other proceeds through many years. (*c*) They manufacture spermatozoa.

Corroboration of these statements is furnished by the study of cryptorchids and castrated animals. In undescended testicles the seminal cells are usually absent, whereas the interstitial gland cells remain. Such individuals develop normally, except that they are sterile, and when such testicles are removed sexual capacity and inclination disappear. The same condition results from occlusion of the vas in man, i.e., there is a disappearance of seminal cells, which is quite analogous to the atrophy of the tubular structures after occlusion of the pancreatic duct.

So far as conditions permit similar statements can be made regarding the ovary and its internal secretions.

While the thyroid, the testes, and the ovaries, which have so much to do with nutrition, are then to some extent concerned in the production of the status lymphaticus, its more important expressions are, however, seen in involvement of the thymus and of the lymphatic tissue and apparatus throughout the body, but more particularly in its interior. The condition is met with most often in children, less often in young adults. Along with it goes such reduced power of resistance against all deleterious influences as to permit of sudden death from cardiac failure and from causes which seem disproportionately trivial. Such deaths have occurred, for instance, not merely during anæsthesia, but from convulsions during the exanthemata and diphtheria, and even during bathing.

The status lymphaticus is also spoken of under other names, as *lymphatism*, *lymphatic constitution* and *status thymicus*, the latter because of the apparently active participation of the thymus in some of these cases. Thymic enlargement had been often noted in times past, at autopsies, but its relation to the other features which make up the general picture of status lymphaticus were unknown until Rokitansky, in 1842, first recognized the condition, but confused it with tuberculosis of the lymphatics. The death, a few years ago, of a son of Professor Langerhans, of Berlin, shortly after the injection of antitoxin intended to protect him from diphtheria, and the subsequent discovery that the boy was the victim of this condition, caused a widespread interest in and study of the problems involved. These have apparently to do with the *thymus* more conspicuously than with any other isolated organ of the body. The thymus normally begins its involution within a few months after birth, and it should have disappeared at puberty. In the status lymphaticus this involution does not occur, but the enlargement persists, or even increases, up to adult life, varying greatly in different cases, its weight ranging from 20 to 135 grams.

We are as yet far from conversant with the function and purposes of the thymus, although, for convenience, it may perhaps still be grouped among the lymphatic tissues. Its juice contains numerous leucocytes which find their

way into the general circulation, and it is credited with producing a secretion analogous to that of the other ductless glands. Its extract injected into dogs produces great fall of blood pressure, with acceleration of the heart, and, in fatal doses, dyspnœa and collapse. Enlargement of the thymus may cause death by pressure on important structures, even other than the trachea. Aside from dyspnœa, mechanical in character, it produces a peculiar type of asthma, which has been for some time known as *thymic asthma*, in which death sometimes occurs most unexpectedly and rapidly. In these cases autopsy rarely reveals anything abnormal other than its enlargement, although at times the cut surfaces exude a milky fluid; but in all of these cases there will be found, in addition to changes in the thymus, a *general hyperplasia of the lymphatic system*, with enlargement of the superficial and deep nodes, especially in the neck, the axilla, the groin and the abdomen. Furthermore the spleen enlarges and the Malpighian bodies seem to be packed with lymphoid cells. At the same time, there often occurs enlargement of the heart and increase in the thickness of the arterial walls. All this is sometimes so marked that Virchow suggested for it the name Lymphatic-chlorotic constitution. Narrowing of the aorta, which is usually noted in these cases, is really due to the same lymphoid infiltration.

Of very great import to the surgeon are the *relations between rickets and the status lymphaticus*, which are so frequent and conspicuous as to indicate more than a casual connection. Nearly all cases of lymphatism display the ordinary clinical evidences of rickets. By some such relation may be best explained the benefit which accrues in many cases of rickets from the administration of thymic or pituitary extracts.

Enlargement of lymphoid tissue occurs also in the walls of the alimentary canal and in those rings of adenoid tissue which mark the site of embryonic canals. This tissue may be seen in miniature around the origin of the appendix, while its most conspicuous illustrations are seen about the pharynx, where not only the pharyngeal but the faucial and lingual tonsils are enlarged. It is in these cases that we get the so-called *adenoids* of the throat specialists, in their most conspicuous expressions, while it is of the greatest interest to the surgeon to appreciate that the deaths that have occurred in connection with the status lymphaticus have happened perhaps more often in operations upon the naso-pharynx than under any other circumstances. It may be significant also that after death the normal yellow marrow of the bones seems to be replaced by red marrow.

Another expression of lymphatism may perhaps be found in what Kaposi some years ago described under the name *Lymphodermia perniciosa*, a rare condition characterized by a scaly, itching skin, exuding fluid, with later a diffuse and doughy condition of the affected parts, and then by nodules which sometimes ulcerate, the lymph nodes and spleen being also enlarged, and the general health being greatly impaired.

Thymic asthma has been in times past often called *Laryngismus stridulus*. Whether or not the latter often occurs without the former is not the primary question here, but their very frequent association is of great importance to the surgeon.

Medico-legal questions of no small interest also rise in this connection. In the status lymphaticus death usually occurs after a series of convulsions, and yet it may happen without a warning, just as it does during or after anæsthesia. Convulsions of any character in adolescent individuals and young children should raise a suspicion of this condition. Of still greater surgical importance is it that all possibility of the existence of the condition, when suspected, should be eliminated before operation is undertaken. It is perhaps to be feared that deaths occurring during anæsthesia are more often directly attributable to the anæsthetist than it is pleasant to acknowledge. Nevertheless there are certainly instances of this kind where he should be held absolutely blameless so far as administration of the anæsthetic is concerned, and where death may occur as by a lightning flash.

It does not, in effect, follow that chloroform is to be blamed in these cases; rather is the blame to be ascribed to the status itself. Under these circumstances death may occur at any stage of the anæsthesia, or a little time after it

has been discontinued. It is most significant that the conspicuous illustrations of the relation between the condition and sudden death have occurred during operations upon the throat and nose. This seems to show the role played by the very adenoid tissue against which the operation is directed.

It is indeed an interesting and at the same time an unanswerable question, why individuals with well-marked status lymphaticus should live apparently comfortably for years and then suddenly succumb from some seemingly trifling cause.

The relations between the thymus and the thyroid are apparently unmistakable, though obscure. In perhaps one half of the cases where the thymus is enlarged the thyroid is also increased in size. Experimentally when one is removed the other seems to undergo compensatory enlargement, as though their functions were to some degree interchangeable. Much less is known as to the relations of either of these bodies to the pituitary, and as yet nothing has appeared concerning their relations with Luschka's gland.

Diagnosis. A recognition of the status lymphaticus is not always easy. Nevertheless there are certain features which are always suggestive and should arouse suspicion; among these the close relation between it and rickets, already alluded to, may furnish a hint, and when recognized, a positive warning. Widespread enlargement of the lymph nodes supplies another. The presence in the naso-pharynx of adenoid growths, especially when accompanied by enlargement of the spleen, should be regarded as furnishing a very suspicious connection; while if, in addition to this, the thymus be found enlarged, either by palpation or percussion, the diagnosis may be regarded as established. Moreover, these children, for such they usually are, have a pasty complexion, an anxious facies, and usually a sluggish disposition. Aside from evidences of rickets they are usually anæmic, often marasmic, with a special liability to spasm of the glottis; the thyroid is often enlarged, as well as the thymus. In young adults, these conditions often simulate cretinism, in that they are retarded in growth and infantile in appearance, while sexual development is retarded or impaired.

Treatment. Naturally in every well-marked case of status lymphaticus one should abstain from all operative intervention, if it be possible; yet when the nose and pharynx are obstructed and oxygenation is thus interfered with, it may seem necessary to the welfare of the child to free the nasal channels for breathing purposes.

Under these circumstances it would doubtless be well to prepare the patient for the anæsthetic by spraying the nose and throat with a one to two per cent solution of cocaine, to which a little adrenalin may be added. Inasmuch as these operations are usually quickly performed, the best anæsthetic would probably be ethyl chloride. This, at least, may be used at first. As against the dangers of operative procedures we may feel that we have a powerful protection in the possession of adrenalin. Assuming that the result of the experimental injection of thymic juice proves it to have a depressing and pressure-lowering effect, it will be instantly seen how much can be done to counteract or ward off danger by the use of adrenalin, both previous to the commencement of anæsthesia and, if necessary, during it. By all means, then, the affected surfaces should be treated with the cocaine spray, in order to deaden acute liability to those impressions which, conveyed to the brain, may produce prompt vascular and cardiac disturbance. When operations must be performed on those known to be subjects of glottic spasm or laryngismus stridulus, one should be prepared to do a tracheotomy on exceedingly short notice, and, if the thymus be enlarged, it might be well even to make this the first operative procedure, using, if necessary, a long trachea tube. Should thymic enlargement itself call for operation, preliminary tracheotomy should not be omitted.

It must be said of these cases that, provided they can be successfully conducted through the particularly dangerous period, the improvement which results after completion of the surgical treatment is most gratifying; thus, for example, after clearing out a mass of adenoids from the naso-pharynx the welfare of the patient is quickly enhanced.

The best measures, then, in case of impending or actual danger, will prove to be adrenalin,

artificial respiration and tracheotomy, as emergency measures when called for.

It will frequently happen that a patient is brought for surgical attention in whom this condition may be recognized, and it should be looked for in every anæmic, ill-nourished child. Save in cases of extreme emergency operation should then be delayed until sufficient fortification can be afforded. In some cases it may be profitably postponed for weeks or months. During this time these children should be given the benefit of most carefully selected nutrition, outdoor air, sunlight, and of the especial benefits conferred not alone by such preparations as the phosphates or glycero-phosphates, but *by thymic or pituitary extract, in suitable doses*, administered three or four times a day. The improvement that may be seen after this method of preparation will be equally astonishing and gratifying.

THE QUESTION OF AMPUTATION IN DIABETIC GANGRENE

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FOR a long time the particular susceptibility of diabetics to gangrene has been known, and among the various gangrenous processes, those of the limbs are by far the most frequent. However, the mechanism of the production of these lesions and the reason of this particular susceptibility has given rise to numerous theories, and still, at the present time, the question has not been completely elucidated. Kuchenmeister believed that the necrobiotic process acted as a means for the elimination of sugar, while Schiff thought that the glycosuria was the effect and not the cause of the gangrene, basing this assertion on the fact, so frequently noted, that the glycosuria disappeared after amputation of the diseased limb. Demarquay and Ladeveze are probably nearer the right when they state that the impregnation of the tissues by the sugar is a cause of weakness which renders them more susceptible to slight lesions, and, according to their point of view, in studying the question, gangrene has been considered as the result of a blood and organic dyscrasia, of which glycosuria is the symptom. The limbs most exposed to injury are those the most frequently involved in a necrobiotic process.

Of recent years the question has been studied with more precision, and the microscope has allowed one to build theories on more solid bases. In 1892 Auché demonstrated the influence of peripheral neuritis on the evolution of gangrene in diabetic subjects. His conclusions may be summed up as follows: (1) Peripheral neuritis may develop during diabetes without the interference of any other cause; (2) the nerve lesions show themselves by an ensemble of disturbances involving motility, sensibility, nutrition, and the vaso-motor system; (3) the pathogenesis should not be looked for merely in the presence of sugar in the tissues of peripheral nerves. The neuritis is probably due to several causes, such as anhydremia, acetonemia, and disturbances in the general nutrition; and, finally, perhaps, there may be some action from certain ill-defined chemical substances circulating in the blood of diabetic subjects.

The peripheral neuritis may consequently explain the production of the necrobiotic process. The trophic disturbances, such as anæsthesia, pain, and so forth, which are the ordinary forerunners of the gangrene, are certainly symptomatic of a lowering of the vitality of the organism, which, for this reason, cannot oppose any destruction to the agents producing disease, since they offer no real resistance to them. Reynier also admits the presence of peripheral neuritis and the part it plays in the etiology of diabetic grangrene, and he has demonstrated the importance, as a diagnostic and prognastic element, of the absence or presence of the patellar reflex in diabetes. If this reflex has disappeared, Reynier considers all surgical interference as both dangerous and

useless. Commenting on the recent discoveries, he admits the existence of nervous and pancreatic diabetes, having a particularly quick and fatal evolution. To neuritis he adds atheroma and arterio-sclerosis, a condition so frequently found in elderly and debilitated subjects. In point of fact, gangrene of the limbs is more liable to arise in diabetic subjects of advanced age, and therefore there is nothing astonishing that, if other causes of lowered vitality become added to arterio-sclerosis and phlebo-sclerosis, the tissues are placed in a particular condition of *minoris resistantiae*.

According to Heidenhain, the poor condition of the blood is the cause of gangrene in diabetic subjects, but, to my way of thinking, no one particular etiological factor can be upheld as the unique cause. One should recognize the part played by each one of the above-mentioned factors, which frequently are found united in the same subject, and the practical result comes to this, namely, that this diabetic possesses arises in an organism incapable of resisting external agents. The sugar, the poor circulation, the neuritis, and concomitant visceral lesions disturb the vitality of the tissues, and in these patients there certainly exists a greater receptivity; their tissues represent an excellent culture media for bacteria, on account of the chemical changes that they undergo, and they appear, as shown by the researches of Ebstein, more exposed to necrósis.

To the above-mentioned causes of lowered vitality, which in themselves are quite sufficient, recent researches have added still another, whose part is very considerable—I refer to microbic infection. It is well known that, as long as the integuments remain intact, gangrene offers a lesser tendency to invasion, but, if some irritation is produced, such as an ulceration or a scratch, the necrobiosis produced will take on a fearful intensity and progresses rapidly. It is by this wound, by this open door, that the bacteria enter, and on these tissues, on this debilitated organism, they multiply and acquire a special pyogenic action. The influence of the soil on the development of bacteria has been demonstrated long ago, and Groewitz showed that the injection of a culture of pyogenic bacteria, even when given intra-abdominally, does not give rise to suppuration, unless it is suspended in a caustic liquid, or some substance capable of disorganizing the tissues. Such, according to his way of thinking, is the manner of action of sugar on the tissues.

Bujwid, some time ago, carried out very interesting researches with solutions of sugar. He injected a culture of the staphylococcus, and it only became pernicious when introduced along with a twenty-five per cent solution of GLYCOSE. If the solution was weaker, say at twelve per cent, a single injection was insufficient, and it was necessary to repeat it for four days following. The result remained negative if the sugar solution was injected four days after the inoculation with the bacteria. He also says that if, after having injected sugar into the veins, the bacteria are introduced subcutaneously, a gangrene is produced quite similar to the form met with in diabetics.

The general health of the patient consequently plays a very great part in the action of infectious agents, and, as has been pointed out by Roger, it is an error to believe that a pathogenic microbe, when introduced into an organism, must, of necessity, produce a disease, and always the same disease. In order that an infection shall arise, the consent of the organism, so to speak, must be given, and the clinical characters that it will represent will depend more on the condition of the subject than upon the microbic agent. According to the disposition of the subject, the lesion will either be mild or serious, circumscribed or diffused, frankly inflammatory or purulent or torpid and gangrenous. Gangrene results, in point of fact, from the same microbic agents as does suppuration, and the clinical difference merely results from the differences of one patient to another.

Jeannell has practically expressed himself in the same terms, when he says: "Tel microbe, plus ou moins banal, inoculé sur le membre d'un organisme intoxiqué d'avance, pullule à l'excès et aboutit à gangréner la région où il est inoculé. Ce n'est pas le microbe qui est spécialement virulent, c'est l'organisme qui est débilité et cultivable."

From the preceding experiments, it would seem to result that gangrene in diabetics is more apt to follow an infection, while its gravity will directly depend upon the general con-

dition of the patient. In them phagocytosis may be sluggish, their receptivity greater while the virulence of the bacteria in presence of sugar explains the frequency and the rapid evolution of these gangrenes. As we know, bacteria, even of pathogenic varieties, are found in the human organism in the normal state, and are, generally, under these circumstances, inoffensive; but they represent a permanent danger, because, when a traumatism or a solution of continuity of the skin takes place, these microbes, which, in healthy subjects, would only have produced a mild irritation, find in diabetics a favorable soil for their development, giving rise to serious inflammatory phenomena. To sum up, it may be said that the pathogenesis of diabetic gangrene of the extremities is a complex affair. The impregnation of the tissues by sugar, peripheral neuritis, arteriosclerosis, microbic infection, and a debilitated organism are occasionally distinct and separate causes, but they are frequently united, in order to produce a necrobiotic process in diabetics.

Diabetic gangrene of the limbs, as I have endeavored to show, is the result of a pathogenic process nearly always of a complex nature. The symptoms of this affection are evidently in direct relationship with the various causes which produce it; but, however, I believe that clinically, the question may be considerably simplified, and, with Jeannell, I would divide diabetic gangrene of the extremities in to *aseptic* and *septic* forms.

Aseptic gangrene, in which no action of a microbic agent can be discovered, is the result of purely trophic disturbances. Arteritis, phlebitis, and peripheral neuritis are its ordinary factors, while impregnation of the tissues by sugar adds its unfortunate influence. Here, one is dealing with the so-called dry gangrene, whose evolution is ordinarily slow, without any tendency to rapid progression. Its apparition usually is made evident by various prodroms, such as prickling and local anesthesia, which are simply symptoms of trophic disturbance. Pain, which is usually dull, may occasionally take on a particular intensity when there is a concomitant arteritis; this painful anesthesia is, in my experienec, frequently met with in diabetic gangrene. Soon after this a black spot appears, either around a nail or on the skin, which slowly extends in surface, and gangrene has become constituted.

In cases of arteritis, with arterial obliteration, the pain is sudden and intense, while the pulsations of the artery can no longer be perceived at the point of the lesion or even above. The skin becomes black, dry, and parchment-like; blisters appear, filled with a cloudy, serous fluid, in which no bacteria can be found, microscopically or otherwise. Usually dry diabetic gangrene becomes limited, and then a sulcus appears, which marks the limits of the disease, and where reparative reaction of elimination and cicatrization will soon appear, but if left to itself this type of gangrene may be of very long duration, although without giving rise to any complications.

However, this dry, trophic, aseptic gangrene may become infected, and then a more dramatic part of the play is reached, because the septic form makes its appearance; one is no longer dealing with a dry, aseptic type, but with the moist septic form.

An excoriation, or a badly cared-for wound, have been the occasion for the appearance of the phenomena of inflammatory irritation, and these, which, in other subjects, might have been insignificant, take on a really fearful intensity in the particular soil offered them by the diabetic.

Occasionally diabetic gangrene may be moist from the start. A corn, a wound, or a boil in diabetic subjects who are in good condition, are up to a certain point simply tenacious, suddenly take on a serious aggravation. The inflammation rapidly extends; infection has been produced, either from badly directed treatment, or for some other reason. The process will undergo its evolution with rapidity; the tissues are infiltrated and edematous, and the entire limb is swollen by a characteristic serum possessing a nauseating odor. The integuments, which are pale at some points, dark violet in others, become covered with purulent blisters, and fistulæ arise, giving exit to strips of necrosed tissue. All this merely indicates the process of putrefaction. On these tissues, impregnated with sugar and badly nourished, the microbic agents have taken on such virulence that mortification has

arisen with terrible rapidity, and, at the same time, the general phenomena become accentuated. The temperature rises, and the patient, greatly prostrated, rapidly enters into coma; the fatal outcome is inevitable if a hasty surgical interference is not resorted to. In point of fact, what represents the danger of these gangrenes is the fact that they have little tendency to become limited, and, in cases of the septic type, the entire limb becomes involved in a few hours or within a day or two. At the same time the bacteria do not only produce a necrobiosis of the tissues, but the toxins secreted from the gangrenous process, as well as the toxins secreted by the pathogenic organisms as well as toxins resulting from chemical action arising in the midst of the tissues, add to the gravity of the situation. These toxins are absorbed in a quantity all the greater, the greater the extent of the lesion, and rapidly poison an organism which, even before the advent of the gangrene, was in a poor condition to react. Consequently, without recourse to a prompt and intelligent surgical interference, the patient is fatally condemned to septicemia and cachexia from infection within a very short space of time. Although less bad, the prognosis of dry gangrene presents a certain gravity none the less, because infection, always imminent on account of this very favorable soil, may occur at any time, and then the dry gangrene becomes of the moist variety, offering the same dangers of infection and cachexia.

Fortunately, aseptic gangrene may remain aseptic, and some few rare examples are known of dry gangrene which have not resulted in the death of the patient, but danger, nevertheless, exists, abstraction made of possible microbic infection. Even in these cases chemical reactions arise in the midst of the necrobiotic tissues, which, as has been well demonstrated by Gangolphe, may produce pyogenic toxins, whose absorption rapidly leads to cachexia, and this poisoning by non-microbic pyogenic toxins being eliminated, other inconveniences still subsist.

The debilitated organism is not in a condition to allow a perfect repair to take place, and the reaction arising over the line of demarcation is quite insufficient to allow elimination of the diseased structures to go on quietly, so that cicatrization will be a long process. A bad stump may be the result, while in the wound suppuration may persist until some intercurrent visceral complication closes the scene by carrying off the patient. It is consequently not only useful, but absolutely necessary, to interfere surgically in diabetic gangrene of the extremities, and I shall now endeavor to prove that radical intervention is urgent, and that the operative prognosis should not be considered as sombre at the present time as was formerly the case. From the cases reported in literature, as well as from my own personal experience, I think it is fair to conclude that diabetics, like other patients, are quite fitted for surgical treatment. However, when operating upon them, the interference should be carried out with rapidity, and be as radical as possible. If one waits, or is contented with purely palliative treatment, he exposes his patient to complications, such as infection, septicemia, and cachexia, against which the latter can no longer struggle. The disappearance of the glycosuria and the improvement in the general condition of the patient testifies to the benefit which may be derived from the operation. However, the treatment of gangrene of the limbs in diabetics, although entering into the general category of surgical affections and interferences, should be examined with a particular care, always remembering that they present special indications.

In the first place the notion of the existence of diabetes in a given patient should always raise the attention of the practitioner, and it becomes absolutely essential to institute immediately a prophylactic treatment, which should consist in constant care relative to a perfect antisepsis and asepsis. The slightest wound, the most insignificant scratch, should be dressed with the minutest antiseptic care possible, and every irritation or traumatism, no matter how mild should be avoided. The dressings, the instruments, and the operator himself should present the most irreproachable conditions of asepsis, because gangrenous phlegmons, or moist gangrene, not infrequently occur, following an ulcerative process arising in small wounds, but which have been badly cared for and have become irritated.

An obligatory accessory to the prophylactic

treatment is the general antidiabetic treatment, and when a patient presents a glycosuria, the physician should immediately institute and rigorously carry out an appropriate treatment. The therapeutic agents of diabetes are numerous, but they are out of the domain of the surgeon, so that I shall not refer to them here. I would, however, say that antipyrin, opium, and the alkalines, to which a severe diet is added, appear to be the principal elements, but it should be recalled that each patient presents special indications. I would, however, insist on the fact that either before an indicated operation, or in less urgent cases, it is of all necessity to care for the general health, in order to allow the patient to cover the expenses of tissue repair or to support the operative shock.

Now we come to the case where gangrene has occurred and its symptoms are in no way doubtful, and the question arises: What should be the surgical conduct to be directed against the local affection? It appears to me useful to go into this question somewhat at length.

Gangrene of the lower limbs in diabetic subjects affects two clinical types, namely the *dry* and the *moist*. The former is perhaps less dangerous than the latter, at least primarily so, because as long as the skin remains intact infection is not imminent, and consequently operative interference is less urgent.

Two treatments are possible under these circumstances, namely, to keep either the focus of gangrene in an aseptic condition or to remove it altogether. The patient's surroundings may oblige one to resort to the expective treatment, while any doubt as to the real limits of the disease, the condition of the subject, or the fear of weakening him by the loss of blood from the operation, may occasionally oblige one to carry out the first-mentioned line of treatment. Antisepsis, combined with the strictest asepsis, may finally limit the gangrene, but in diabetics antisepsis cannot be undertaken haphazard, and should be rigorous, although not too energetic. Iodoform, salol and boracic acid give good results, but powerful antiseptics may be dangerous in these subjects. The bad condition of the organs of elimination and their defective functionating are the reasons for this susceptibility. When too powerful, the antiseptics may be the occasion for the production of phenomena of irritation in these debilitated and intoxicated tissues, which may easily end in inflammation, suppuration, or necrobiosis.

But, as soon as these reasons for expectation have disappeared, it is better to at once have recourse to a more radical interference. I have shown how that even in a dry, limited, and aseptic gangrene, danger nevertheless subsists, because septicemia, cachexia, and infection are always possible. Amputation of the limb is the method of choice, and which alone can bring about an absolute cure, and I shall take up the conditions and rules which should govern the surgeon in this amputation further on in this paper.

Moist gangrene has a rapid and invading evolution; the incessant and intolerable pain from the arteritis frequently force the patient himself to beg for a prompt and radical interference. The rapid extension of the process, the depression in the general condition, and the interests of the patient readily lead the surgeon to acquiesce to his request.

Two cases can present themselves to the surgeon, namely, those where the gangrene is moist, but limited; and, secondly, those where the necrobiotic process has no limit. In the former, certain operators have carried out armed expectation. The surgery of the present day has a conservative tendency, and, if one decides to wait, the following treatment should be carried out. Firstly, an easy exit should be given to the infectious fluids and toxic products retained within the tissues; and, secondly, to limit the inflammatory process. For this purpose Vidal has claimed that the cautery is the most useful, and he advises numerous and deep incisions made in the midst of the necrobiotic tissues, and carried as far as the healthy tissues. These incisions should, however, be sufficiently far apart in order to avoid necrobiosis of the strips of tissue. The cautery certainly destroys the bacteria, awakens the tissue vitality, and may occasionally put a stop to the further progress of the infection. Naturally, antisepsis is an indispensable addition to cauterization. Poncet particularly recommends large hot baths at the temperature of 45° or 50° C., frequently renewed and containing a small amount of some antiseptic, such

as sublimate. Under their influence the wound cleans up, granulations develop, and cicatrization takes place. These baths should be stopped as soon as the healthy granulations make their appearance, because they make them soft and prevent epidermitization from taking place. The dressings, which should not be too frequently renewed, should, however, be made every third day, conforming to all the rules of antisepsis. With antisepsis a successful outcome is frequently possible, but the dangers are ever present. The patient may not always be able to pay the expenses of a good repair, and cachexia, by absorption of the toxic products, will soon overcome an organism in such a low condition of resistance. A traumatism, an intercurrent affection, may be the starting point of the gangrene, and the prognosis becomes serious. There consequently is everything to gain by removing this mortified limb, which represents a vast focus of infection. Amputation is certainly indicated, and, according to my way of thinking, is the method of choice which should only be discarded when one is sure that the case is incapable of being ameliorated; for example, if the patellar reflex has disappeared.

Now, when gangrene is not limited, amputation is no longer the method of choice, but becomes a method of necessity. In presence of a moist gangrene, extending deeply, having rapidly involved the skin, the cellular tissue of a limb, or a portion of the member, it is necessary to act rapidly and amputate. If hasty measures are not taken, the temperature will soon rise, the general condition becomes more and more profoundly involved, and the life of the patient will be seriously compromised. Under these circumstances operative complications were formerly the rule, but, at the present time, thanks to modern methods, it is possible for us to become masters of the situation. Amputation alone can oppose an inattackable barrier to the gangrenous process, and, consequently, in gangrene of the limbs in diabetics, when of the moist type and unlimited, amputation should be undertaken as early as possible.

The question, however, comes up as to when to amputate and at what point of the limb the amputation should be made; and, in reply to this, I would say that if the case is not an urgent one, as it is in cases of unlimited and moist gangrene, it is well to place the general condition of the patient in better shape so that he may more easily support the operation. Consequently, one should commence by adopting an appropriate antidiabetic treatment, and locally the part should be dressed with antiseptic dressings and the limb kept quiet and raised, so as to wait for the line of demarcation to become distinct. As soon as an improvement is manifest and the quantity of sugar in the urine diminished, amputation may then be undertaken. As to the point where the amputation should be made, it at once becomes evident that the surgeon must not be too economical, because, if the incision is made too near the boundaries of the necrobiotic process, there is danger of the occurrence of gangrene in the flaps, and a recurrence of the process in the operative wound. One should always bear in mind that in the gangrene of diabetics there may be deep extension of the necrobiotic process, extending considerably beyond the apparent limits of the disease. If the amputation is made too low, it may involve tissues that are already diseased and quite incapable of undergoing the process of repair, and would inevitably necessitate a secondary amputation, which, for patients already debilitated, is not to be looked upon with any amount of favor. Consequently, one should make the amputation in the midst of absolutely healthy tissue, at a considerable distance from the focus of the disease, as this is the only means by which one may attain successful primary union, and avoid all possible gangrenous complications in the flaps. I wish, however, to have it understood that in emitting and advising the above procedure, I am referring exclusively to cases of moist gangrene extending rapidly without any evidence of becoming limited.

The following rules, indicated by Heidenhain some ten years ago or more, are still valid: (1) If there is extension of the process to the dorsum or palmar aspect of the foot, the amputation should be made above the condyls of the femur; (2) amputation below the knee is frequently accompanied by gangrene of the flaps, and places the patient's life in danger; (3) high amputation is indicated when the gangrene is progressive, although there may be no eleva-

tion of the temperature. Hutchinson recommends always amputating at the lower third of the thigh, both in diabetic gangrene and in gangrene from arterio-sclerosis, while Powers appears to adopt Heidenhain's opinions. Godlee distinguishes diabetic gangrene of a painful and rapid progress due to arteritis and gangrene from neuritis, which is less painful and slower in its evolution. In the former process he recommends high amputation, while in the latter he believes that one may remove the limb fairly near the limits of the lesion.

I have already pointed out that arterio-sclerosis was more or less frequent in diabetic subjects, and, on account of this condition of the vessels, I am of the opinion that high amputation should always be done, because one will then be sure to do away with the danger of having the flaps supplied by vessels which are obliterated, and thus give rise to gangrene. Particularly in the case of diabetic gangrene of the lower extremities, I incline very strongly to amputation of the thigh at the lower third, because the blood supply of the flaps is better assured than elsewhere on account of the anastomoses of the gluteal, ischiatic and the satellite artery of the great sciatic nerve. In the case of the upper extremity, the amputation should also be made high up, but the indications of the point at which it should be carried out is not based on pathologic reasons, as in the case of the lower limb. One should operate in such a fashion as to procure flaps in good condition and whose blood supply is assured. The point of incision should only be carried in absolutely healthy tissues.

It goes without saying that the operation should be carried out with all requisite dispatch, because the short duration of the interference will greatly diminish the shock and also the loss of blood. Esmarch's band, in my opinion, should never be used in diabetic subjects, because the compression that it exercises results in a severe traumatism, which, in the diabetic, might result in a second gangrenous process arising at the point of application of the band. Far be it from my intention to discuss the various methods and techniques of amputation, but I would, in closing, formulate one or two bits of advice. It is well to avoid any contusion of the tissues, and the incision should be clean cut so that the flaps are, throughout, equally well supplied with blood. If the incision is irregular, there is danger of points of gangrene arising, and the inevitable result is that the process recurs in the wound. Then, again, unlike many operators, I believe it preferable to endeavor to obtain union by first intention, and for this purpose I prefer in these cases silkworm-gut sutures. The only point to be careful about is that the sutures are not too near together or too tightly tied, and the removal of any liquid between the flaps is assured by sufficiently large drainage tubes. It is hardly necessary to say that the most rigorous antisepsis and asepsis should be observed during the entire operation and should be continued quite as carefully during future dressings of the stump, while a carefully directed diet and constant care will greatly accelerate recovery.

CONSERVATION OF THE PARIETAL MOTOR NERVES IN ABDOMINAL SECTION[1]

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APPARENTLY so little attention is paid by the majority of operators to the trunks or distribution of the nerves supplying the abdominal region, that one might conclude that their preservation is a matter of no importance. Nevertheless, they do receive consideration from many men, and the general fact that section of a motor nerve is followed by atrophy of its mucle fibers; the particular observations of Assmy, made at the instigation of Czerney, showing that even the vertical incision in the rectus causes degeneration of the portion of the muscle mesial to the cut nerve fibers; and the assiduous care with which such a sound thinker as Kocher always and in all cases seeks to avoid the section of even small nerve trunks, lead me to present this paper for your consideration.

1. Showing incision from lower border or twelfth rib to linea semilunaris. The twelfth nerve having been isolated at this line, the incision is extended upwards and the flap raised. The twelfth nerve is shown posteriorly in the upper lip of the wound and hypogastric in the lower lip, while the twelfth nerve is also shown where it has been picked up and drawn out at the linea semilunaris to allow the flap to be turned upward.

Before presenting any work, two questions should be answered in the affirmative: First, is there any reason for such work? Second, is there any reasonable possibility of its execution?

As to the first, while no anatomical change is an evil until it produce symptoms, still the interdependence of the parts of the whole body for their normal function is so intimate and far-reaching that one can hardly think of a large area of the abdominal parietes being rendered actually functionless without believing that there must in all cases be an extra effort on the part of the unparalyzed muscles to bring about compensation, and when this compensation is defective there will be the tax on the involuntary muscles, which, if too great, will result in exhaustion, imperfect function, neurosis.

So long as we continue to refer to all patients without tangible lesions as neurasthenics, we are not in a position to say that this or any other anatomical change, no matter how small, is without consequence; nor that, in some cases, a certain number of the disagreeable symptoms often seen following abdominal section are not from this cause.

The fact that these symptoms are often transitory, and that they occur after median section, does not disprove my point, for compensation, when established, will correct the symptoms, and this, at most, must be one of but a number of causes of post-operative neurenthenia. Granted that compensation is established, we can never foretell in what case further operative procedure, nerve lesions, or age, may weaken or render functionless other muscular areas, which will later destroy this compensation and add an extra burden to the declining functions of age.

The second question, is the procedure prac-

[1] The anatomy basis of this paper is from the anatomical laboratory of the Washington University Medical School.

2. A dissection of the abdominal wall from the inner side. The sheath of the rectus has been removed, as have parts of the transversalis muscle, to expose the tenth, eleventh, and twelfth thoracic nerves in this part of their course lying on the deep surface of the internal oblique muscle. The wavy arrangement which allows of their being drawn out is still preserved in the twelfth. The nerves crossing the outer border of the rectus entering its posterior surface are also shown.

FIGURE 3*a*. Subcostal incision on the left side, showing 10th and 11th thoracic nerves crossing the wound.

tical? is to be answered by saying that in some instances it is so difficult as to be put down as impractical; but, in most cases, by properly directing the incision, or by picking up nerve trunks when they are easily found, it is possible to avoid cutting them. In the following pages it is proposed to show just in what classic cuts the nerves are to be avoided, and how; and to give the lines upon which incisions may be made which will likely pass between the nerve trunks.

While every student of medicine can locate each intercostal nerve, few stop to think that the abdominal continuations are almost as constant in their position.

Upon the origin and distribution of these nerves exact observations have been made by Bardeen,[1] while Head[2] and others have given their general areas of distribution. As to the exact course of the trunks and their landmarks, little more is to be found in text-books than that they continue forward in the same

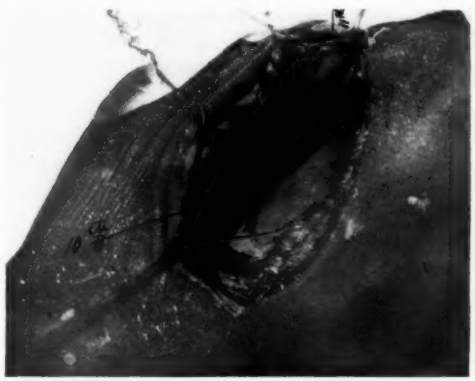

FIGURE 3*b*. Subcostal incision on the left side, showing 10th and 11th thoracic nerves drawn aside.

[1] Bardeen: A Statistical Study of the Abdominal and Border Nerves in Man. Am. Journ. Anat., Vol. I, pp. 202-228.

[2] Treves' Surgical Anatomy. 1903.

direction that they had in the chest wall, between the internal oblique and transversalis muscles. Cunningham's statement that they run parallel to a line drawn from the tenth costal cartilage to the umbilicus is as true as any general rule on the subject.

In order to tabulate reliable data more exact than given in text-books, I wrote down my conclusions from observations made in the anatomical laboratory of the Washington University Medical School, and then undertook to verify them by the examination of ten special dissections. The accompanying table gives the result.

The following developmental facts bear directly on our subject. The primary ventral cutaneous branches of about the lower six thoracic nerves are caught between the successive tips of those myotomes which give rise to the rectus muscle, and in this way the segmental arrangement of the nerves of the abdomen is early insured.[1]

The transverse tendons of the rectus abdominis muscle in man correspond to the seventh, eighth, ninth, tenth, and eleventh ribs.[2] Of them, the tenth, corresponding to the umbilicus, is very constant, while the eleventh is very often absent. It was so in all but one of the bodies here tabulated. The seventh and eighth nerves enter their segments of the rectus below, while the tenth and eleventh enter above the corresponding lineæ transversæ. With a l, those nerves tend to have constant positions that go to segmented portions, while the nerves

FIGURE 4*a*. Incision through the linea semilunaris in lower part, showing 11th and 12th thoracic nerves.

[1] Bardeen and Lewis. Develop. of Limbs, Body-Wall, and Back of Man. Am. Journ. of Anatomy, Vol. I. pp. 1-36.

[2] Mall. Development of Ventral Abd. Wall in Man. J. of M., vol. xiv. p. 2, 1898.

FIGURE 4*b*. Incision through the linea semilunaris in lower part, showing 11th and 12th thoracic nerves drawn aside.

entering non-segmented areas lose their regular arrangement.[3]

It will be observed from the table that the position of the ninth and tenth nerves is rather constant, while that of the eleventh varies much, but the eleventh goes to a non-segmented part of the rectus. The twelfth, while it also has no transverse tendon to guide it, has a somewhat regular position, which is due, I think, to its taking a direct course to the pyramidalis muscle, which it supplies.

The practical points are, we can indicate approximately the point at which the nerves emerge from the ribs. The lower four thoracic nerves can be isolated between this point and the linea semilunaris by splitting the fibres of the internal oblique, which split will be oblique to the course of the nerves in the lower part of the abdomen, and vertical in the upper part. We can outline the course of these nerves on the surface, and make parallel cuts between them. The nerves to the rectus, with the exception of a few small fibres, enter its posterior surface some distance from the outer border. Upon leaving the costal border, the seventh and eighth nerves turn upward out of the way. The ninth and tenth nerves pierce the internal oblique apponeurosis after having crossed behind the outer border of the rectus. The eleventh generally, and the twelfth always, pierces the internal oblique apponeurosis to enter the sheath at the outer border of the rectus. Below the twelfth rib the nerve lies in rather loose connective tissue, and is easily found. The hypogastric and inguinal nerves lie out of the way of

[3] Bardeen. *Loc. cit.*

all but the more vertical lumbar incisions. Not least in importance is the fact that in the contracted abdomen there is sufficient nerve tissue to allow the nerves to be drawn aside after being isolated.

It is not correct to speak of these nerves as stretching. As shown in the twelfth nerve, in figure 2, in which the original arrangement is partly preserved, the redundant nerves are drawn up into little folds by the elastic connective tissue in which they are imbedded.

Of the various abdominal incisions, the least harmful is that made in the median line, either straight through or continued through the posterior wall of the sheath after the rectus has been drawn outward. It is only when these incisions are inadequate that we have to consider the nerves. Quite as harmless, if we avoid the nerve trunks, for it cuts no muscles, is that made in the linea semilunaris. Some nerve fibres will be divided wherever we cut into muscle by any other method than proper splitting, but we can, in most cases, avoid the trunks

In the subcostal incision for approaching the gall bladder, which is four inches long parallel to and from one and one-half to two inches below the right costal border, the tenth and eleventh nerve trunks will be severed if the wall is cut straight through. The fibres of the internal oblique run parallel to the cut, so that it can be split, and in this way the nerves may be found and drawn aside. This might not be practical in the very stout. Even here part of the supply of the external oblique will be cut off, as it comes from the lateral branches. Using our knowledge of the course of the nerve trunks, we can approach all obscure epigastric cases through an exploratory incision in the median line, and then, if we find that a complicated gall stone operation requires more room, a cut can be made from the umbilicus towards the cartilage of the eleventh rib and a flap turned up containing the eighth, ninth, and tenth nerves, and more room be gained than by any other incision. If it proves to be a gastric case demanding freer access, a supplementary transverse incision may be made between the eighth and ninth or ninth and tenth nerves, preferably the former, which will not cut nerve trunks. Then, if the wound has been kept clean and is well sutured, there need be no fear of hernia.

In the splitting operation, no nerves will be cut if we heed Kocher's admonition, which is to use hooks and tear the muscles apart. Practically the crooked thumbs are efficient.

Kocher's incision for appendicitis, which is three fingers' breadth above and parallel to Poupart's ligament, would most likely be below the twelfth nerve, provided the incision does not extend backwards beyond the anterior iliac spine. The cut for suppurating cases, made one finger's breadth above the ligament, would in most cases go above the hypogastric nerve.

Figure 1 shows an extensive lumbo-lateral abdominal incision that cuts no nerves. A flap of any size may be raised by cutting from the tip of the last rib to the linea alba between the eleventh and twelfth nerves and then extending the incision in the median line. All of these may be modified so as to divide the rectus transversely.

As we are dealing with a complicated organism, where deviations from the average are not necessarily deviations from the normal, we must always be prepared for a variation, no matter how constant the rule. In isolating nerves this is not of constant embarrassment, for it is only in the exceptional case that we will have to make a second trial. All incisions should be made to allow for some variation and it is only in through-and-through cuts that the variation can cause trouble. In this connection it should be remembered that the eleventh, and next, the tenth nerves are the most liable to deviation, and that upward.

In all of this I do not wish to be understood as attempting anything radically new. Innumerable men have worked on the same lines, but I hope that the anatomical data herein given will be of some help to those who appreciate the value of conservation of the motor nerves.

RESULTS OF DISSECTION OF ABDOMINAL NERVES

Conclusions Drawn from General Observations.	Their Verification on Ten Subjects.									
Body No.	1	2	3	4	5	6	7	8	9	10
The 7th nerve emerges into the sub-costal angle mesial of the 8th cartilage or turns up towards the chest from between the 7th and 8th, at or near a line drawn between the upper borders of the 7th costo-condral junctions.	¼ inch below.	¼ inch above.	*	1 inch above.	*	*		½ inch above	*	*
The 8th nerve emerges at a line drawn between the upper borders of 8th costo-condral junctions and turning upwards runs parallel and close to the sub-costal border before entering the rectus muscle.	*	*	*	*		*	*	*	*	*
The 9th nerve emerges at the intersection of the projected lower border of the 8th rib with the sub-costal border.	*	*	*	*	*	*	*	*	*	¼ inch above.
The 10th nerve is found below the lowest part of the 10th costal cartilage at a distance of:	½ inch below.	½ inch below.	¼ inch below.	½ inch below.	¼ inch below.	¼ inch below.	¼ inch below.	½ inch below.	½ inch below.	½ inch below.
The 11th nerve is found below tip of the 11th rib at a distance of:	¾ inch below.	½ inch below.	½ inch below.	¼ inch below.	½ inch below.	¼ inch below.	¼ inch below.	¼ inch below.	½ inch below.	½ inch below.
The 12th nerve is found below the tip of 12th rib at a distance of:	¾ inch below.	1 inch below.	1 inch below.	¼ inch below.	¾ inch below.	1 inch below.	1 inch below.	½ inch below.	1 inch below.	½ inch below.
The 9th nerve crosses behind the outer border of the rectus before piercing aponeurosis of the int. oblique at or above the level of the point it emerges from sub-costal border.	*	*	*	*	*	*	Slightly above.	*	Slightly above.	*
The 10th nerve crosses semi-lunar line by one, sometimes two, branches, usually before piercing aponeurosis of int. oblique, about midway between level of umbilicus and lower border of 10th cartilage.	*	*	*	*	Slightly above.	*	*	Slightly above.	*	*

The 11th nerve crosses semi-lunar line and enters the sheath of rectus anywhere between the level of umbilicus and one-third the distance to the pubis in one trunk or several branches.	⅓ the distance down.	Several branches range from ⅛ to ¼ distance down.	¼ the distance down.	¼ the distance down.	Several branches ⅛ to ¼ the distance down.	Several branches ⅛ to ¼ the distance down.	⅛ the distance down.	At level of umbilicus.	⅛ the distance down.	¼ the distance down.
The 12th nerve crosses semi-lunar line and enters sheath of rectus about one half way between the umbilicus and pubis by one, sometimes two, branches.	*	*	*	*	*	*	*	*	*	Slightly above.
The trunk of the hypogastric nerve will be found first in the substance of the int. oblique and then between that muscle and ext. oblique about one finger's breadth above Poupart's ligament.	*	*		*		*	*	*		*
A line drawn from the twelfth dorsal spine to the upper part of the tubercle on the outer lip of the crest of the ilium will closely correspond to the course of the hypogastric nerve after it emerges from cover of the quadratus lumborum. It here lies under the lumbar fascia. The inguinal nerve may be in a common trunk with the above, or a little below; both nerves may be slightly behind this line at its upper part.	*	*	*	*	*	*	*	*	*	*
A transverse cut through the parietes in the sub-costal angle in a line passing along the lowest point of the eighth cartilage would pass between the 8th and 9th nerve trunks and would be of the following lengths. This is a safe cut.	5 inches.	5 inches.	5½ inches.	5½ inches.	5 inches.	5 inches.	6½ inches.	5 inches.	5 inches.	5 inches.
An angular or semi-lunar incision extending from the sub-costal borders at the point of intersection of the projected lower borders of the 9th ribs or a little above would for most cases pass between the trunks of the 9th and 10th nerves, and would be of the following lengths or greater. In some cases this might cut the 10th nerve.	7 inches.	7½ inches.	7½ inches.	8 inches.	7 inches.	8 inches.	9 inches.	8 inches.	8 inches.	8 inches.
A cut from the tip of 11th cartilage to the umbilicus would pass between the 10th and 11th nerves.	*	*	*	*	*	*	*	*	*	*

*Corresponds with the statement in the first column. A blank space was left where no perfectly satisfactory observation could be made.

COMMON AND HEPATIC DUCT STONES
(CLINICAL REPORT OF A CASE)

By DR. L. L. McARTHUR, CHICAGO

M. G., admitted to Michael Reese Hospital, November 28, 1904. History: Age 25; clerk. Previous health good, always well and strong. Present trouble began nine days ago. Patient states that he caught a cold two weeks previous to onset. Onset was sudden with severe cramp like pains in right hypochondriac region. Pain aggravated by deep inspiration and coughing. Tenderness on pressure. No icterus. Had a chill third day after onset. Chill was followed by a "fever." No nausea nor vomiting though an emetic was given to induce vomiting. Appetite good until of late. Bowels usu-

Section of liver showing: A, large stones in common duct; BB, intrahepatic stones; C, duodenum; D, pancreas.

ally regular. No hematemesis. No melæna. Coughs some, dry and hacking in character. Slight expectoration. No hemoptysis. No night sweats. "No urinary trouble." Drinks some, but not to excess. No venereal history.

Physical examination: Well developed, well nourished young man. Muscle tonus good. Skin warm and moist. Cheeks sunken. Complexion sallow. Ears negative. Eyes—left pupil slightly larger, but reaction and musculature normal. Mouth—tongue has heavy white coat.

Chest—well developed and deep. Pectorals well developed. Breathing thoracic and abdominal, with quiet and equal respirations. On deep inspiration ribs rise, intercostal spaces and sub-costal arch widen. Percussion negative. Auscultation negative. Palpation—fremitus marked, but equal.

Abdomen—skin of chest, face, abdomen, and extremities chocolate colored. In legs pigmentation is spotted. Liver normal. Spleen palpable. Slight tenderness in epigastrium just below ensiform. No rose spots.

Glands negative.

Musculature and nervous systems negative.

December 3, 1904, after attacks of severe epigastric pain (most marked over ensiform cartilage) the patient presents an icteric color generally. Conjunctivæ are bile tinged. Small round tumor about size of gall-bladder in gall-bladder region. Rectus more rigid on right side. No radiation of pain to shoulder, but passes to back in lower thoracic region.

December 11. Urine analysis: Acid, 1015, urea, 1.9, albumin-trace, bile present and abundant, kidney and bladder epithelium present, leucocytes increased, hyaline and granular casts abundant.

OPERATION—CHOLEDOCHOTOMY CHOLECYSTOSTOMY

Bevan S-shaped incision. Gall-bladder aspirated. Contents large amount of mucus and bile. No stones. Gall-bladder walled off by gauze packing. Common duct palpated and found full of stones. Did not succeed in driving fluid around stones into gall-bladder because cystic duct seemed stenosed. One large stone close to posterior aspect of duodenum. Gall-bladder thinned, dilated, not diseased. Common duct dilated, so that it felt like bodies of vertebræ, full of stones to duodenum. Common duct incised. Fluid in duct purulent, cloudy, green, stinking. Four large stones, many soft and many hard small stones (from pinhead to five-eighths inch in diameter). Thick heavy mucus evidently from high up in liver. Bile flows from liver. Stone taken from duodeneal end of common duct with forceps. Tube placed in common duct. Gall-bladder incision closed with puckering string suture of catgut about a tube. Mikulicz placed down to common duct. Heavy waxed silk for tension stitches. Patient died third day after operation of septic cholanangitis.

Especial points of interest are:

First stinking common duct I have noticed.

Gall-bladder as large as an orange.

Colon bacillus pus from common duct.

Large number of stones scattered through the bile tracts in the liver tissue. (See illustration.)

Large size of common duct containing an enormous number of stones, while there were no stones in the gall-bladder.

Stones were of Bilirubin Calcium.

DE LASKIE MILLER, M.D., A.M., PH.D.

DE LASKIE MILLER, M.D., A.M., PH.D.[1]

By J. CLARENCE WEBSTER, M.D.
Professor Obstetrics and Gynecology, Rush Medical College

ON July 9, 1903, in the ripeness of years, passed from among us the oldest Emeritus professor of this college, Dr. De Laskie Miller. He was born in Tonawanda, New York State, May 29, 1818. His early education was obtained in a district school. He had not the advantage of continuous study, but was forced to work on a farm during the summer months, in order that he might carry on his studies during the winters. At the age of seventeen he decided to devote his life to the profession of medicine, and to obtain the means necessary to carry him through college, he worked hard for four years, teaching school in winter and clerking in a country store in summer. During this period he made use of his spare hours in studying scientific and medical books, and in carrying on a correspondence with his friend and preceptor, Dr. Thomas G. Catlin, a cultured and able physician. He attended his first course of lectures in the Albany Medical School, 1840-41, and his second in the Geneva Medical College, where he graduated in 1842.

After practicing several years in Lockport, New York, and in Flint, Michigan, he came to Chicago in 1852 and began his Western career of usefulness and distinction. In 1854 he took a great interest in the establishment of the first general hospital in Chicago, organized by the Rev. Dr. Clarkson, rector of St. James church, afterwards Bishop of Nebraska, and was appointed its physician and surgeon. The esteem in which he was held by the profession from the very beginning of his work in this city is evidenced by his election to the presidency of the Chicago Medical Society in 1856. He was appointed to the professorship of obstetrics and diseases of women and children, in Rush Medical College in 1859, a position which he held until 1889, when he retired from the active duties of the chair and was appointed Emeritus professor. In 1892 he took another position of honor in the college, being elected president of the board of trustees. During the last ten years of his life he continued to take a keen interest in the affairs of the school, being foremost in helping to raise the standard of education. He was a strong advocate of the measures which resulted in the affiliation of the college with the University of Chicago, and up to the very hour of his death he worked enthusiastically for the consummation of the broad and liberal plans which have been under consideration in the university and college, whose aim is the extension and improvement of our facilities to carry on medical instruction and research.

Dr. Miller worked in this school throughout the greater part of its existence. He came to it when it was weak and struggling; he left it one of the strongest on this continent, and though it had not entered upon that vital union which it was his ambition to accomplish, he was in no way discouraged, for he knew well that the college was animated with the lofty purpose of elevating the standard of work, accepting no compromise with mediocrity, preferring to perish gloriously rather than to enjoy a meretricious fame based upon shallowness and pretense. Dr. Miller's influence must be preserved by us as a precious memory, and our archives must contain a full record of his services in order that our successors may always be able to attribute to him the merit which he deserves.

It is particularly worthy of commendation that at the end of an active professional life, he did not seek inglorious ease, but continued to think and work for his college up to the last day of his life. His old age was characterized by buoyancy and youthful enthusiasm. The poet's complaint that "crabbed age and youth cannot live together" did not apply to him. There was no evidence of senility save weakness of body. It was not his custom to disparage the aims and achievements of the present generation and to exalt the thought and deeds of the past. Medicine was to him a progressive science. He had lived through the greatest period of its evolution, and realized that the triumphs of the past were but stepping-stones to more glorious successes. He indulged, indeed, very little in reminiscences of bygone days, but was keenly alive to the importance of present activities and to the promise of the future. All phases of medical advancement interested him, and he was particularly generous in his estimate of the value of the work of young men. Though he might not have agreed fully with recent Oslerian utterances regarding the relative values of youth and old age, he was never niggard in his appreciation of the services of the younger workers in the profession. I dwell particularly upon this mental characteristic because it is striking and exceptional. Medi-

[1] A memorial address delivered at the Quarterly Convocation, Rush Medical College, March 24, 1905.

cal history furnishes many illustrations of the unprogressiveness, fossilization and bigotry of scientific teachers who have passed their prime, and of their antagonism or indifference to new ideas, especially when coming from young men. The tragic story of Semmelweiss is known to most of you.

In 1846, as an assistant in the Vienna Lying-In Hospital, he began his memorable observations on puerperal infection, occurring in that institution. In studying the history of the institution he found that from 1784 to 1822 the obstetricians performed no post-mortem examinations, and that the average mortality during that period was 1.25 per cent. From 1825 to 1833 post-mortem examinations were made, the mortality increasing to 5.3 per cent. In 1839 the institution was divided into two parts, one for students, the other for midwives. In the latter the mortality fell to 2.6 per cent, whereas in the former it rose to 9.5 per cent, remaining at this level for five years, excepting in 1841-43, when for a period of twenty months it averaged 16 per cent, at one time being as high as 31.3 per cent.

One of his friends, in making an autopsy on a case of puerperal fever, contracted blood poisoning and died after a short severe illness. Semmelweiss noted that the post-mortem conditions were similar to those often found in women who had died of puerperal infection, multiple abscesses and suppurative phlebitis being present. He concluded that the lying-in women were inoculated by the fingers of students who worked in the autopsy and dissecting-rooms, and he believed the infective material to be animal matter. Thereupon he ordered the students in attendance upon the women to refrain from making autopsies, and to wash their hands in a solution of chlorid of lime. Immediately the mortality from puerperal infection fell to 3.05 per cent. Subsequently he stated that the infective material was not only cadaveric material, but any animal tissue in a state of putrefaction, and also the lochial discharge of women already diseased. He insisted that possible carriers of infection, e. g., hands, clothes, and instruments, should be cleansed. The mortality soon fell to 1.27 per cent. Owing to the bitter opposition and scepticism of his colleagues, Semmelweiss was forced to leave Vienna and his ideas found little acceptance anywhere. He established himself in Buda-Pesth where he succeeded in the Rochus Hospital in reducing maternal mortality to 0.85 per cent. His ideas, however, did not have much influence, and after some years of work in the face of constant opposition, he died insane.

In his own special sphere of work, Dr. Miller was singularly free from prejudice. In his career, he had witnessed the overthrow of too many beliefs not to think that there might still be something new to learn. He had lived through the struggle to establish in this country the revolutionary ideas based upon the work of Pasteur and Lister. He early adopted the measures which transformed lying-in hospitals from charnel-houses to the safest of retreats for parturient women. He had witnessed the terrible overthrow of the proud and eloquent obstetrical teacher of Philadelphia, Meigs, who had flouted and ridiculed the views regarding puerperal infection which were first advanced in this country by Oliver Wendell Holmes, and which have been so triumphantly established in later years.

As a lecturer Dr. Miller was distinguished for his superb diction and polished style. He was never labored or tedious, but always exercised a marked fascination on his hearers by his exquisite refinement and literary finish.

Alas, that we shall not look upon his like again! Present-day teachers have forsaken the methods of the past. Like the Scotchman in Robert Louis Stevenson's sketch, we have developed voracious appetites for facts and we have become utterly careless in regard to the literary quality of our presentation of them to students. Forcefulness is more to us than grace, and, indeed, in the intensity of our desire to instruct we adopt methods which might be compared to the discharge of batteries of artillery, some light, others of heavy weight, noisy, sometimes effective, never entrancing. Laboratory methods have ruined style. The search for truth has interfered with the telling of it. Before the present era in medicine, theories accumulated faster than facts and a good style was essential to their successful presentation. Indeed, in many instances, the reputation of great medical teachers depended solely on this qualification. Now, facts multiply with such amazing rapidity that our time is mostly occupied in gathering, storing and sorting them. We don't give our students numberless formulæ for pills and powders, as was the custom of the teachers of old. We unload our facts upon them, too often, it must be confessed, raw, undigested, disconnected. We spend too little time in meditation or in endeavoring to establish relationships between our facts, a higher function than the accumulation of them. Indeed, in our scientific zeal we tend to lose the power of discrimination in the gathering process. Everything goes into our baskets and we stagger along like beasts of burden, when we should be like keen active

soldiers in the field, carrying no more than is sufficient to permit the greatest degree of accomplishment with a minimum of effort. Every now and then a giant arises in our midst, whose capabilities amaze his fellow-workers. The great majority of us are not of this stature, and our power is limited. It is advisable that our scientific ardor should be tempered by practical necessity. The end and aim of our work is to prevent and cure disease. In our respective spheres as teachers, we may perhaps best attain to that capacity for discrimination, the lack of which I have bemoaned, by bearing in mind at all times the practical end in our selection and use of facts.

As a man Dr. Miller was characterized by great amiability, modesty, and courtesy—a true gentleman of the old school. He did not deteriorate by his transition from the quiet East to the newer and rougher life of the rapidly growing metropolis of the West. Though medical feuds and dissensions were common in his time, he made few enemies, and ever continued to command the deepest respect both of the profession and the laity. He never sought advancement by meretricious arts. As a physician he was upright and pure, and he ever upheld the honorable traditions of our ancient craft. Whatever may be your success, gentlemen of the graduating class, make it your constant endeavor in your lives to attain to the ideals which ever influenced the career of our late venerated friend and teacher, Dr. DeLaskie Miller.

PELVIC INFECTIONS IN WOMEN[1]

By THOMAS J. WATKINS, M.D.

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A STUDY of pelvic infections as an entity instead of a consideration of infections of the various pelvic organs separately has certain advantages. The infections of the various pelvic organs are very intimately associated as the disease readily extends from one to another organ, and in the majority of cases nearly all of the pelvic organs are involved to a variable degree. One is frequently called upon to treat cases where nearly all of the pelvic organs are involved, and seldom, if ever, where the infection is limited to one of the organs.

This paper will not attempt to treat of this subject in detail, as that would include so much that is common knowledge and would require more time than is at my disposal.

Pelvic infection is much more important than any other class of pelvic diseases on account of its frequency, on account of the large mortality which attends it, on account of the immense amount of suffering which it produces, and because nearly every case can be prevented, as it is almost invariably consequent upon ignorance or carelessness.

Its frequency is emphasized by the fact that 50 to 75 per cent of the gynecologic patients in our hospitals suffer from pelvic infection. It produces all the inflammatory disease, is the most common cause of sterility, is a very frequent cause of dysmenorrhoea and miscarriages, and over 50 per cent of the aggravated cases of displacements of the uterus are the result of pelvic infection.

Nearly all pelvic infections occur through the vaginal canal, a very few of them reach the pelvis through the general circulation, and a very limited number are the result of migration of bacteria through the intestinal walls. Pelvic infections occasionally occur through the appendix. This may result without rupture of the appendix. When the appendix ruptures, the pelvic organs necessarily become more or less involved.

The gonococcus is a more common cause of pelvic infection, especially in the non-puerperal state, than any of the other micro-organisms, and produces more suffering than all the other bacteria. In spite of all that has been written upon the necessity of cleanliness in obstetrics, and notwithstanding the medical profession knows and appreciates its importance, puerperal infection continues to be a rather frequent disease in women confined outside of public institutions. It would be unjust to infer that puerperal infections do not occasionally occur

[1] Read before the Illinois State Medical Society, May 17, 1905.

in public institutions. In fact, puerperal infections, at rare intervals, result when all known aseptic precautions are practiced.

In non-puerperal cases the majority of pelvic infections are the result of gonorrhœal infection. Considerable attention has of late been called to primary tubercular infections of the pelvic organs, especially of the Fallopian tubes. The author's experience, observation, and study would indicate that primary tubercular infections of the pelvic organs in women are especially uncommon, and that they are usually associated with tubercular peritonitis (probably secondarily). The frequency of inflammatory diseases in the pelvic organs would act as a rather common predisposing cause to a secondary tubercular infection. In non-puerperal cases pelvic infection may result from carelessness in the preparation of the hands for pelvic examination and treatments and from neglect to sterilize instruments for diagnostic and therapeutic purposes. This applies especially to the use of the intra-uterine instruments. "Catching cold" does not produce pelvic inflammation.

PATHOLOGY

It is unnecessary for me to enumerate to this society the changes that take place in the tissues as the result of an infection. An inflammation in one part of the body is much the same as an inflammation in any other portion of the body. This fact seems to be often ignored in treatises on the specialties. The extensive, complicated, and various classifications of endometritis exemplifies this statement and has done little except to confuse the student. An endometritis is much the same as an inflammation in any other mucous membrane.

An infection is detected by the changes which it produces in the tissues and these pathologic manifestations are usually proportionate to the extent and virulence of the infection. These changes are called inflammation, and there has been a tendency to regard the inflammation, instead of the infection, a disease. Inflammation is not primarily destructive but a protective process. Its tendency is to save and not to destroy the tissues. An inflammation might be likened to a fortification. The building of forts mars portions of the country but it tends to limit the invasion of the enemy and tends to protect it against injury. The changes in the tissues known as inflammation tend to protect the body in a similar manner from bacterial infections.

In non-puerperal cases the infection usually extends by continuity of tissue along the mucous membrane, so that an infection extending beyond the uterus in non-puerperal cases nearly always produces a salpingitis and secondarily a pelvic peritonitis and ovaritis. In puerperal cases the infection more often extends by the lymphatics and blood vessels, and as a consequence ovarian infections are more common than tubal infections, and a myometritis for the same reason is more pronounced in puerperal than in other infections.

There is much yet to be learned of the relation of bacteria to disease. The septic symptoms of pelvic infections are due chiefly to the toxines produced by the bacteria and not directly by the bacteria. In cases of suppuration the bacteria pass freely through the abscess walls, and often do this without producing serious results.

The proof that the bacteria do migrate through the abscess wall, is that they are found in tissue beyond the abscess wall and that they are smaller than the intercellular and connective tissue spaces. The inflammatory exudate and adhesions found beyond the suppuration is chiefly the result of the migration of bacteria.

Pelvic infections, like other infections, may or may not result in suppuration. In chronic suppurative cases the pus is usually sterile. The pus is usually sterile after the patient ceases to have fever. An elevation of temperature may remain after the bacteria have ceased to exist, as is shown at times by examination of the pus in cases operated upon before the febrile disturbance has entirely disappeared. If the pus becomes sterile, why do cases of pelvic infection often have repeated attacks of pelvic peritonitis and why do they not all result in a spontaneous recovery? Some of the bacteria, especially the gonoccoci, we are informed by good authorities, remain latent in the tissues a long time and finally become active. The repeated attacks are, I firmly believe, usually reinfections from the vagina or uterus or through an intestinal wall adherent in the

pelvis and in close contact to diseased tissue. Numerous cases of pelvic infection even involving the tubes and ovaries terminate in a spontaneous and complete recovery.

Some cases of abscess in the pelvic organs go on to a spontaneous recovery without discharge of the pus. The fluid portion of the pus in these cases, after it becomes sterile, absorbs and the solid portion forms a cheesy-like mass and may become calcareous. This explains some of the calcareous masses occasionally found in the pelvis.

The belief is common that a sactosalpinx is the result of obstruction of the Fallopian tube at its uterine end. This is not so, it is the result of obstruction at its fimbriated end. I do not know of a case where the uterine end has on microscopic examination been found occluded but in all of them the abdominal end is always closed. The uterine end is, however, often constricted. A pelvic abscess in non-puerperal cases is almost invariably secondary to suppuration in the ovary or tube and very seldom results otherwise.

CLINICAL HISTORY

The illness often dates from marriage, from a protracted convalescence following labor or from intra-uterine exploration or treatment. The illness may date from "exposure to cold" or to a suppressed menstruation, which usually means that the infection extended at that time to the Fallopian tubes. The patient usually, but not always, gives a history of a purulent vaginal discharge. There is often a history of cystitis. Febrile disturbances are usually present in the acute cases where the infection extends beyond the uterus. Pain, tenderness, and gastro-intestinal disturbances are usually present when the pelvic peritoneum is involved. The symptoms in pelvic infections are usually intermittent or remittent.

DIAGNOSIS

The diagnosis of pelvic infections is usually not difficult to make. The pain, tenderness, swelling, and febrile disturbances encountered in cases of pelvic infection is found in very few other pelvic diseases. The following are the chief diagnostic points:

1. History of an infection.

2. Signs of an acute or chronic infection about the vulva. An infection in Skene's glands usually means a gonorrhœal infection. An infection in these glands is usually observed by noting a redness about the meatus urinarius, a thickening of the urethrovaginal septum on one or both sides and often more marked on one side. Palpation will show the glands enlarged and they will feel like a large needle imbedded in the septum, and one can often force secretion out of them by exerting pressure upon them.

Points of redness may often be observed about the Bartholinian and other vulvo-vaginal glands and on palpation pus may be forced out of them. The presence of these signs usually means a gonorrheal infection, but their absence does not exclude it.

3. Leucorrhœal discharge.

Microscopic examination in the acute stage of gonorrhœal infection should always be positive but in the chronic stage and in other infections it is of little or no service. The usual presence of numerous varieties of bacteria in the vagina makes the result of bacteriological examinations unsatisfactory.

4. Redness about the external os is always present in cases of endometritis, but it may be present in cases of laceration of the cervix with erosion. An erosion, however, is more often a result of an infection than of a laceration.

5. Infection of the endometrium. This is usually manifested by:

   a. Redness about external os.
   b. Uterine mucopurulent discharge.
   c. Dysmenorrhoea.
   d. Menorrhagia.

6. Tenderness on palpation.

Mistakes in the diagnosis of salpingitis and ovaritis, suppurative or not suppurative, are not infrequently made as can be determined by the attendance upon gynecologic clinics. These are most often mistaken for ectopic pregnancy or ovarian cysts with torsion of the pedicle. In fact, it is at times impossible to distinguish between these conditions without abdominal section.

Intermittent or remittent attacks of acute pelvic symptoms usually means a pelvic infection. One should remember that pelvic infections are often associated with other pelvic diseases.

Blood changes are always present in acute pelvic infections. Leucocytosis is always present in acute pelvic infections, and is often a valuable diagnostic symptom between inflammatory and non-inflammatory diseases of the pelvis. In chronic pelvic infections, however, blood examinations are usually of little value. One often mistakes pelvic infections for ectopic pregnancy and vice versa. Typical cases are easily distinguished, but typical cases of both diseases are common, and at times it is impossible with our known means of diagnosis to differentiate between the two diseases without abdominal section.

PROGNOSIS

Any pelvic infection is always serious on account of the danger of extension to the ovaries, tubes, and peritoneum. It has been estimated that about 50 per cent of the cases of gonorrhœa in women extend to the endometrium. No estimates have, to my knowledge, been made of the percentage of gonorrhœal endometritis to gonorrhœal salpingitis. The dangers of rupture of a pyosalpinx, ovarian, or pelvic abscess into the general peritoneal cavity have been exaggerated. This very seldom occurs, because the suppuration is in the lowest portion of the peritoneal cavity and because the general peritoneal cavity is usually well protected by adhesions of the omentum and intestines, and by the presence of a large amount of round cell infiltration. The presence of these conditions explains why a pelvic infection seldom produces a general peritonitis except in puerperal infection. In the primary attack of pelvic peritonitis there is always a possibility of a spontaneous cure resulting. A few cases of gonorrhœal salpingitis with marked swelling about the uterine adnexae go on to a complete spontaneous recovery.

The following cases prove this statement.

Mrs. N. was seen in consultation some seven or eight years ago, and was found to be suffering from an acute gonorrhœal infection. She had an acute pelvic peritonitis and apparently a general peritonitis. An inflammatory mass was present, which involved both uterine adnexae and extended upwards nearly to the umbilicus (double salpingitis). There was a history of infection from the husband, who had an acute gonorrhœal urethritis. The treatment was non-operative, and she made an apparently complete recovery. Two years later vaginal section was made for relief of a retro-position of the uterus. The uterine adnexae and peritoneum were found to be free of disease, save for the presence of a few velumentuous adhesions to the uterus and left ovary. She has since given birth to a healthy child. The gestation and birth were normal and she was free of any pelvic disease when seen about six months ago.

Miss H. consulted me six years ago for relief of a gonorrhœal vaginitis and endometritis. She finally developed an acute salpingitis on the left side with marked swelling of the tube. About six months after apparent recovery she suffered from an acute bilateral salpingitis with decided enlargement in the region of both uterine adnexae. About three months following recovery from this an abdominal section was made and both Fallopian tubes appeared perfectly normal. Both ovaries, however, were somewhat cystic and adherent. Plastic operations were made on both ovaries, and the adhesions were separated. Some six months later she again had an acute bilateral salpingitis with marked swelling in the region of both uterine adnexae. About six months after recovery from this attack an abdominal section was again made and the ovaries and tubes were again found apparently normal. The repeated attacks of salpingitis were probably reinfections from the endometrium.

The gonorrhœal infection is, however, the least liable to result so favorably on account of "the latent character of the germ" and on account of the large amount of inflammatory exudate that it produces, and on account of the dangers of reinfection. In most cases of puerperal infection, which do not suppurate, one can be almost certain that resolution by absorption will be complete. Infections that extend beyond the uterus tend to produce adhesions, and these adhesions often produce much suffering and are often difficult to relieve by operative or other remedies. These adhesions, however, often decrease in number and size and elongate, and at times entirely disappear by absorption.

TREATMENT

Prophylaxis includes a study of the entire subject of prostitution, and such a study would require too much time to attempt to consider here. Pelvic infection would be much lessened if it were possible to instruct the laity of the dangers of gonorrhœa. Physicians could accomplish much by explaining to every one of their patients, suffering from gonorrhœa, the dangers of the disease. Physicians often err in informing patients that they are cured of gonorrhœa, as it is difficult to determine when a cure has resulted, even with a most careful microscopical examination.

It is to be hoped that the use of rubber gloves will become generally adopted in the care of obstetric cases, as this would, in all probability, minimize the number of cases of puerperal sepsis, as there is no doubt that most cases of puerperal fever are due to hand infection.

It would be well, were it possible, to require every physician to use an instrument sterilizer in his office, so as to diminish the danger of carrying infection from one patient to another. The use of intra-uterine sounds, except in rare cases and under every careful aseptic precaution, for diagnostic purposes should be abandoned. The employment of intra-uterine treatments in the office has much more tendency to cause than to cure disease.

Efficient treatment of a gonorrhœal vulvo vaginitis will diminish the danger of extension of the disease to the uterus, Fallopian tubes, and ovaries.

I am in the habit of giving the following directions for gonorrhœal vulvo vaginitis:

1. Keep the patient in the recumbent position.

2. Swab the diseased surface thoroughly with a 4 per cent solution of silver nitrate every two or three days for one or two weeks.

3. Use one-half per cent solution of lysol for vaginal douche three times daily.

4. Use 5 per cent protargal in boro-glycerite vaginal suppositories at bed time.

This treatment should be effective if persisted in for one or two weeks. Vaginal douches should be used during the two or three menstrual periods following the infection, because the infection is especially apt to extend at that time. This douche should be warm, so as not to disturb the menstrual flow.

The treatment of an acute endometritis of a non-puerperal case should be palliative. In chronic endometritis curettage with topical application is usually the only remedy that gives much relief. Curettage, however, is always an incomplete operation on account of the contour of the uterine cavity. Tent dilation is much better for this operation than rapid instrumental dilation, because its results are more permanent, it compresses the utricular glands and forces out their secretion, it does not produce tears, and thus tend to produce scar tissue in the cervix. There is no more danger of sepsis from the use of tents than from the other instruments if they are perfectly sterilized and if an aseptic technique is practiced.

The treatment of an acute infection of the Fallopian tubes, ovaries, and pelvic peritoneum in the non-puerperal state should almost invariably be palliative, because:

1. Complete resolution may occur by absorption.

2. There is not much danger to life at this time as the disease is almost certain to be quarantined by adhesions and round cell infiltration.

3. The acute stage, under appropriate treatment, usually lasts only a short time.

4. The dangers of operative treatment in the acute stage is much greater than the dangers of delay plus the dangers of operation during the chronic stage of the disease.

The following are the essentials of a treatment for the acute stage of these diseases which usually give very satisfactory results.

1. The patient is kept in bed.

2. An ice bag or hot water bag, preferably the former, is kept over the seat of pain.

3. Opiates are given if needed for severe pain.

4. An enema consisting of magnesium sulphate one ounce, glycerine two ounces, water three ounces is given once or twice daily to move the bowels and for local depletion.

5. Keith's mixture.

R Magnesii Sulphat—gr. xx
Magnesii Carbonat—gr. x
Aq. Menth, Pip—ʒ ss

is given each morning every hour for a few doses if needed to produce free bowel movements. Exceptional cases may require incision and drainage of an abscess, and very exceptional cases will require a radical operation during the febrile stage of a pelvic infection. Curettage has no place in the treatment of salpingitis, as the Fallopian tubes do not drain into the uterus.

What place should hot vaginal douches and topical application have in the treatment of chronic cases of pelvic infection? Hot vaginal douches are very generally used for cases of chronic inflammation of the uterus, ovaries, and Fallopian tubes. The douches do have some effect upon the vaginal blood and lymphatic vessels, but the disease affects tissues supplied by the ovarian and uterine blood vessels and lymphatics. In these cases the douche is used for ten to twenty minutes twice daily. Who would think of applying hot applications to inflamed issues in other portions of the body for ten to twenty minutes twice daily? No one would pour hot water on the fingers for ten to twenty minutes, twice daily, for a chronic inflammation in the wrist joint; and yet the circulation of the fingers and wrist are more intimate than is the circulation of the vagina and uterine adnexa.

The cervix and vault of the vagina are frequently painted with tincture of iodine, with the hope of relieving the patient of an inflammatory exudate about the ovaries and the Fallopian tubes. Would it not be better, if one desired to use iodine, to administer it by mouth?

Applications of ichthyol and glycerine in the vagina are also frequently employed. The glycerine does deplete, but can depletion of the vaginal tissue affect an inflammatory exudate in the ovaries and tubes when they have a different blood supply? It does not seem probable that the ichthyol can come in sufficiently close contact to the disease in these cases to produce a so-called alterative effect, or to relieve pain. The reply is frequently made that these treatments do produce good results. It would seem that the good results would have to be attributed, in these cases, to the kind action of nature, to other remedies employed, or to suggestive therapy. This paper is not intended to infer that all cases of chronic infection of the uterus, ovaries, and Fallopian tubes require operative treatment. It would, however, infer that many of these cases are not operative, and that general remedies are often more valuable than local ones in the treatment of the milder cases of chronic pelvic infection.

It is impossible, in a short paper, to say much of the operative treatment of the chronic cases of pelvic infection. All cases of chronic infection of ovaries and tubes should not be operated. All cases, which are attended by much thickening about the ovaries and tubes, that cause repeated acute symptoms, more or less continuous pelvic distress, or appreciably affect the general health of the patient, indicate operative interference. The presence of an old pelvic infection, with involvement of the ovaries and tubes, is not sufficient indication for operative treatment.

One should not forget, in these days of operative furor, that deaths do occasionally follow abdominal sections, that convalescence is sometimes protracted, and that perfect recoveries do not always result. The facilities for operations, and the experience and skill of the operator and assistants, are important factors in determining for or against operative treatment.

When operations are made in cases of salpingitis and ovaritis it is seldom necessary to remove the uterus, and enough ovarian tissue can almost invariably be left to preserve menstruation. Resections and plastic operations upon the ovaries are usually attended by good results.

Resections and plastic operations upon the Fallopian tubes for salpingitis, however, frequently results unfavorably. Pregnancies after these operations are uncommon, inflammatory exudates and adhesions sometimes result, and reinfections often occur. Such tubes, when subjected to plastic operations, may require subsequent removal. Unilateral salpingectomies are always attended by some risk, as infection in the Fallopian tubes, like the bronchial tubes, is seldom unilateral.

PROLONGED LAVAGE A PREVENTIVE OF ETHER-VOMITING AFTER OPERATION

By GEORGE S. BROWN, M. D., BIRMINGHAM, ALABAMA

THE interesting article "Post-Operative Vomiting" by Dr. Eugene Boise, published in the first number of "SURGERY, GYNECOLOGY AND OBSTETRICS," has suggested to me, that perhaps a short account of my experience in the treatment of this condition by prolonged lavage, might be of interest to some who have not been very successful in the management of it.

Assuming that it is the ether that causes the vomiting, either by its direct influence on the vomiting center in the brain or by its irritant effect on the wall of the stomach as it is excreted in the mucus or both, it occurred to me some three years ago that the lavage after operation should not stop with washing out the stomach, but should be prolonged until the ether itself was all washed out of the blood.

The experiment carried out in the physiological laboratories of injecting lethal doses of morphin under the skin of dogs, and then recovering practically the whole amount by prolonged lavage, I believe first suggested the idea, and I have carried it out in all cases since.

That ether is excreted in large quantities by way of the mucus of the stomach is evident from the fact that the washings from the stomach and the vomited matter when the stomach is not washed, smell strongly of it. The ordinary plan of washing out the stomach until the water comes back clear does not go far enough. In such cases if the patient vomits after that, the vomit has as strong an odor of ether as it had before, showing that the ether is still being poured into the stomach through the mucous membrane. When the ether is all out of the blood the vomiting ceases, but as we all know, this may require three or four days to be eliminated in the ordinary way, and in these cases the vomiting is still further prolonged by the exhaustion or what we might call the vomiting habit.

My experience has been that where the washing is continued long enough practically all the ether can be washed out of the blood, and ether-vomiting prevented in practically all cases. In some cases the anesthetist has allowed the patient to come out, and there has been trouble about doing it well.

Even in these cases if the stomach contents can be got rid of the patient will quiet down and allow the washing to be continued for a sufficient time to wash the ether out of the blood. The patient should, however, be kept well under the effects of the ether until the stomach is empty; the ether can then be withdrawn with the perfect assurance that the stomach tube will not rouse him. If the patient struggles and chokes the timid beginner will be inclined to withdraw the tube and give it up; but if the course is persisted in, the washing can be thoroughly done in practically all cases.

We carry out the principle still further by insisting on the patient drinking a glass of water whenever they have any nausea after waking. In these extreme cases (cases in which the stomach has not been washed to the full extent of washing the ether from the blood), vomiting may recur two or three times during the first twelve hours, but the more water they drink and vomit, the more quickly is the ether eliminated.

When the patient is in the proper condition, our plan is to continue the lavage until two and a half or three gallons of tap water has been poured into the stomach (a pint or quart at a time) and siphoned out.

When this amount is used the last wash water will have little or no smell of ether about it, the post-ether sleep will pass off frequently in an hour or two, and at the end of twelve hours there will be no smell of ether in the breath.

In a few patients the post-operative vomiting has been prolonged for a day or two, but in all of them it was clearly due to morphin that had to be given for pain. I may say that the treatment of these cases has been

the same with regard to the water given. The more they drink and vomit, the quicker they get rid of the morphin.

During the last three years this plan has prevented vomiting absolutely, in more than half our cases. In the other half the patients vomited from one to five or six times; but all this was accounted for by the fact that from one thing or another the washing was not kept up long enough—the struggles of the patient, the impatience of assistants, or what not. These claims may sound extravagant to some but they can be easily verified by any who will take half an hour more time, use three gallons of water, more or less, and (unless there has been an operation on the stomach itself) generously allow the patient all the water he will drink afterward.

Ether-vomiting has had no terrors for us for three years; and since we have become particular to see that the washing is properly done, we never have any that lasts as long as twelve hours, and these vomit only at long intervals the water they have been drinking, and then they vomit with all ease and the greatest relief.

A SAFE, SIMPLE, AND SURE CURE FOR GANGLION

By BENJAMIN BRABSON CATES, M.D., KNOXVILLE, TENNESSEE

THE best treatment I know for the cure of ganglion, occurring in connection with the tendons of muscles, whether on the upper or lower extremity, is the injection of a preparation of campho-phenol.

Now, works on surgery recommend pressure, striking the ganglion with a book, puncture with irritation of the sack, counter irritants, and when these fail, to cut it out. I have never cured a ganglion by any of these remedies. Those cases I have ruptured by striking, or pressure, or aspirated and irritated the sack with a needle, have invariably returned.

I have seen cases of "weeping sinew" follow attempts at removal by excision, in the practice of other physicians. I myself once lost a patient from general tuberculosis following the removal by excision of a ganglion of large size from the peroneal muscles in a man.

I have never failed to effect a cure by injecting a ganglion with campho-phenol. The campho-phenol is prepared by mixing equal parts of crystalized carbolic acid and gum camphor. The resultant mixture is a pure white, slightly oily solution, with a strong camphoraceous odor. It is a safe, efficient, non-toxic preparation, having all the good effects of carbolic acid, with none of its bad effects. (It is a capital remedy for cuts, bruises, sprains, etc., and may be rubbed over the parts with impunity with the naked hand.)

The modus operandi of using the campho-phenol in ganglion of the tendons, is simple enough. All you need is a hypodermic syringe to hold the medicine. You prepare your hands, hypodermic syringe, and field of operation with the same scrupulous care as if you were going to remove the ganglion with a scalpel.

Having done this, you draw fifteen or twenty drops of the campho-phenol into the hypodermic syringe, according to the size of the ganglion, then, without evacuating any of the fluid in the ganglion, thrust the needle of the syringe directly into the center of the ganglion, and push the piston home; withdraw the needle. I have never used but one injection into a ganglion. As there is always some reactionary swelling following injection into the ganglion, it is best to wear a splint for a few days in the case of the upper extremity, and to lie quietly in bed with the limb elevated, in case of the lower limb.

For a few days it appears as if the tumor would have to be injected again, but wait a few days, and you will notice that it gradually grows less, till it entirely disappears.

EDITORIALS

SURGERY, GYNECOLOGY AND OBSTETRICS

SURGICAL PUBLISHING CO. OF CHICAGO
103 STATE STREET - - - - CHICAGO

SUBSCRIPTION PRICE, FIVE DOLLARS PER ANNUM IN ADVANCE

Managing Editor - FRANKLIN H. MARTIN, M. D.
Associate Editor - ALLEN B. KANAVEL, M. D.

AUGUST, 1905

THE SURGEON AND THE PATHOLOGIST

The oration of Dr. J. Collins Warren upon the relation of pathology to surgery, delivered at the Portland meeting of the American Medical Association, is a masterly address, and shows that pathology is gradually obtaining the recognition that it deserves in its relation to surgery.

From six hundred and fifty-eight cases observed in the Massachusetts General Hospital and one hundred private cases, he has compiled the accompanying table.

Before any one can master his subject it is necessary to have a fixed system of classification, so that as a tumor is examined he may run through in his mind, the chief possibilities in relation to the age and most marked symptoms. This has been very carefully done by the writer, not from a clinical standpoint, but from the histological changes that are common in this, the most changeable of organs.

TABLE I.

	M. G. H.	Private Cases.	Total.	Per Cent.
Carcinoma	459	58	517	68
Fibro-epithelial tumors	....	....	(86)	(11)
(1) Fibrous type	....	....	(70)	(9)
1. Periductal fibroma	48	6	54	7
2. Periductal myxoma	10	2	12	1.6
3. Periductal sarcoma	4	0	4	.5
(2) Epithelial type. (Cyst-adenoma.)	....	....	(16)	(2)
1. Fibro-cyst adenoma	3	1	4	.5
2. Papillary-cyst adenoma	9	3	12	1.6
Hyperplasia.				
1. Diffuse hypertrophy	2	0	2	.2
2 Abnormal involution (Cystic 59.) (Proliferative, 56.)	87	28	115	15
Chronic inflammation	....	....	(28)	(3.7)
1. Eczema of nipple	2	0	2	.2
2. Chronic abscess	5	0	5	.6
3. Ductal mastitis	3	0	3	.3
4. Tuberculosis	13	0	13	1.7
5. Single retention cyst	5	0	5	.6
Non-indigenous tumors	....	....	(9)	(1.2)
Sarcoma	4	0	4	.5
Lipoma	3	1	4	.5
Lymphangioma	1	0	1	.1
Supernumerary breast	....	1	1	.1
	658	100	758	

TABLE II.
INCIDENCE OF BREAST TUMORS BY AGE DECADES.

	No. of Cases.	10-20 Years.	20-30 Years.	30-40 Years.	40-50 Years.	50-60 Years.	60-70 Years.	70-80 Years.	80 Years.
Carcinoma	459	....	6 12%	67 60%	151 70%	130 85%	80 92%	24 100%	1 100%
Periductal sarcoma	4	....	....	....	1 .4%	3 2%	....	....	....
Periductal myxoma	10	....	5 10%	1 1%	3 1.5%	1 .6%	....	....	....
Periductal fibroma	48	4 45%	26 50%	13 11%	4 2%	1 .6%	....	....	....
Fibro-cyst-adenoma	3	....	1 2%	2 2%	....	....	....	....	....
Papillary cyst-adenoma	9	....	....	1 1%	3 1.5%	2 1%	3 3%	....	....
Diffuse hypertrophy	2	1 11%	....	....	1 .4%	....	....	....	....
Abnormal involution	87	....	7 13%	20 18%	45 21%	13 8%	2 2%	....	....
Eczema of nipple	2	....	....	....	....	2 1%	....	....	....
Chronic abscess and ductal mastitis	8	....	2 4%	2 2%	3 1.5%	1 .6%	....	....	....
Single retention cyst	5	....	2 4%	1 1%	2 1%	....	....	....	....
Tuberculosis	13	3 33%	3 6%	3 3%	4 2%	....	....	....	....
Non-indigenous sarcoma	4	....	....	2 2%	1 .4%	....	1 1%	....	....
Other non-indigenous tumors	4	1 11%	1 2%	....	....	1 .6%	1 1%	....	....
Total Cases	658	9	53	112	218	154	87	24	1

First, the condition of the breast at birth, then puberty, then lactation, and at last in-

volution are considered and in each one the common and bewildering phases of nomenclature are dealt with and eliminated in a concise and careful manner.

At the top of both tables we find carcinoma with sixty-eight per cent occurrence, emphasizing, in a most startling manner, its terrible frequency so that, although conservatism is to be advocated, this tumor must not be lost sight of. This is placed in a class by itself, which includes all forms of epithelial malignancy.

The fibro-epithelial tumors are next, which are subdivided into fibrous and epithelial types according to which tissue is the most marked, and in this way he gives five varieties that are definite and have a cause for existing, to replace some seventy-five to a hundred different terms which are confusing and inexact.

Under hypertrophy, two varieties are considered, diffuse hypertrophy which is rare and has little clinical significance, and what he introduces as "abnormal involution." By this he means to replace the great variety of conflicting terms that have originated in the evolution of the subject of breast tumors, be they due to involution or atypical proliferation.

In discussing the cause of this change, which is so frequently mistaken for a carcinoma, he dwells upon the fact that it occurs during the fourth and fifth decade of life when the gland is undergoing the atrophy of the menopause, the gland structure being replaced by fibrous tissue, so that in most cases there is cystic formation in the ducts or acini, due to obstruction of the ducts by an abnormal proliferation of connective tissue. As sub-heads under this type, he gives the small cystic dilatations and the dilatation in which the epithelium also shows a marked activity, sometimes appearing heaped up in the tubules or acini without any apparent injury to the basement membrane. However, cognizance is taken of the fact that these latter are very close to malignant; the frequency with which the actual change has taken place is put at ten per cent.

After this comes chronic inflammations, considered as they are in any other organ and later tumors that are developed in the tissues of the breast irrespective of the gland and its actual components, such as lipoma and lymphangioma.

Frozen sections should be made in all cases of doubt and in a case of abnormal involution it would be necessary to make sections from several different places.

Those surgeons who have not at their command an endowed laboratory, too often omit proper pathological examinations, and it is only when some proper working basis has been established between the pathologist and surgeon that the general profession will be able to realize the ideal which Dr. Warren has obtained.

W. R. CUBBINS.

THE INDICATIONS FOR OPERATION IN PYELITIS AND SUPPURATING NEPHRITIS

A pyelitis makes itself evident by the following symptoms: purulent urine without any disturbances in micturition, a trace of albumin, absence of casts, and a renal tumor. After a careful irrigation of the bladder, with a catheter in the organ, purulent urine may be obtained if the tumor is compressed bimanually, but the diagnosis may be made more certain by resorting to intra-vesical separation of the urine and cystoscopy. Should the urine contain a large amount of albumin and numerous casts, the case is more likely one of pyelonephritis. An hematogenic renal abscess breaking into the renal pelvis may be diagnosticated in cases where

this condition follows infection or traumatism. In these cases the commencement is sudden with chills, high fever, local swelling, and pain, the sudden appearance of pus, blood, and renal elements in the urine, but the tumefaction of the kidney is certainly by far the most important symptom.

The differential diagnosis must be made between neoplasms of the kidney, liver, spleen, ovaries, or intestine, and bimanual examination will here be found of the greatest use. Insufflation of the intestine will show the tumefaction is of renal origin if it is found behind the large intestine and below and behind the distended stomach. Vaginal examination will allow one to recognize ovarian growths. Neoplasm of the liver and spleen become more evident after insufflation of the intestine. If the tumefaction diminishes in size, and at the same time the urine contains large quantities of pus, one may conclude immediately that a renal suppuration is going on. If a fistula is present, coming from the kidney, an injection of methylen blue will color the urine within a very few minutes. An exploratory puncture resulting in the aspiration of a purulent liquid with a urinary odor is also symptomatic of renal suppuration.

As soon as the diagnosis of a suppurative lesion of the kidney has been made a number of eminent authorities advise immediate operation, but we feel that this way of looking at the matter is rather too absolute, because there are a few cases where one can delay, for a short time at least. Pyelitis complicating movable kidney frequently is recovered from by evacuation of the pus by way of the bladder. Rest, liquid diet, and hot applications are frequently sufficient to cause a suppurating kidney to empty its contents, and before operating one should at least wait a few days, or even two or three weeks, if the patient's general condition does not become aggravated. A temperature which remains high and accompanied by chills and sweats, calls for an immediate interference, which, however, should be preceded by a cystoscopic examination in order to ascertain the degree of permeability of the ureters and the functional integrity of the other kidney.

An operation should not be resorted to if the starting-point of the affection is not accessible to causal treatment, such as ulcerative endocarditis, or some affection of the nervous centers, such as tabes. The same may be said of a serious bilateral renal suppuration following some disease of the bladder. But if the renal parenchyma is healthy and a bilateral suppurative process only exists in the renal pelvis, an operation is not contra-indicated. Usually nephrotomy is sufficient to bring about a cure, and in not a few instances patients have completely recovered in cases of small multiple abscesses, when the kidney has been simply split open or a partial resection of the kidney done. As to nephrectomy it is absolutely essential to ascertain the degree of functional integrity of the other kidney before undertaking it, otherwise the patient may succumb from uremia. In patients greatly weakened by the duration of the process, and especially from a continued elevation of the temperature, one should always take into consideration the possibility of cardiac failure, which may complicate the general narcosis. The surgeon should always remain in the just means, not operating too soon as long as he is not assured that the patient may be cured medically; while on the other hand, he should not put off the interference too long when the organism is worn out or a general septicemia or amyloid degeneration have placed the subject in very unfortunate conditions.

CHARLES GREENE CUMSTON.

TRANSACTIONS OF SOCIETIES

AMERICAN SURGICAL ASSOCIATION

TWENTY-SIXTH ANNUAL MEETING, HELD AT SAN FRANCISCO, CALIFORNIA, JULY 5, 6, AND 7, 1905

The Association held its sessions in the banquet hall of the St. Francis Hotel, under the Presidency of Dr. George Ben Johnston, of Richmond, Virginia.

After a brief executive session, Dr. Emmet Rixford, of San Francisco, the first Vice-President, took the chair, and President Johnston delivered his address. He selected for his subject

JOHN PETER METTAUER

Among other things he stated that little was known of the childhood and youth of Mettauer beyond the fact that, raised in an atmosphere of surgery, he imbibed a love for this profession, and easily determined to adopt it as his life's work. He was born in 1787. Mettauer's medical education was carried on under the most favorable conditions obtainable in America at that time. For a period of about forty years the number of surgical patients who gathered to Mettauer for treatment was sufficient to keep him constantly with from forty to sixty cases under his care. Often it was true that about every good house in the community sheltered some person who was convalescing or waiting his turn for operation. Dr. Johnston had heard his operations for cataract put in number far beyond the eight hundred that could be accounted for. Dudley's great record in cutting for stone two hundred and twenty-five times in a practice of forty years must yield to Mettauer's total of four hundred operations, and the number of strictures relieved was commonly put at something over two hundred. Three operations were recalled, performed in the last week of his life, when, at the age of eighty-eight, his eyes were yet keen enough and his hands steady enough for him to make a successful operation for cataract, for stone, and for amputation of the breast. But Mettauer's most brilliant work in the way of operations was his method in treating vesico-vaginal fistula, and his successful employment of wire sutures made of lead, in which he antedated by a good many years even Sims, whose name is generally associated with this operation. So successful was Mettauer that he declared his belief that every case of this sort was curable by his method, and so far as his efforts were reported, the speaker was not aware that he ever failed in one.

Proper pride and regard for his own reputation in the coming years must make every surgeon careful to a degree in assigning credit for useful and honorable achievements to those who had preceded him, and there is in the history of surgery no claim more clear and unmistakable than that of John Peter Mettauer to the honor of discovery in this case, and he is plainly entitled to rank in medical history, and in the grateful memory of his successors, in the same class with McDowell, and Dudley, and Sims, and Mott. Mettauer's first reference to the operation of vesico-vaginal fistula appeared in the Boston Medical and Surgical Journal, Vol. 22, p. 154, twelve years before Sims's communication, and it clearly outlined the operation which ought always to be associated with his name. Mettauer was decidedly of the opinion that every case of vesico-vaginal fistula could be cured, and his success justified that statement.

Reference was made to the eccentricities of Mettauer, and among them was his invariable custom to wear on all occasions a preposterously tall hat. One of his children, now surviving, had told the speaker that she never saw her father without his hat on. He never attended service in the churches, and the explanation was always assumed to lie in his unwillingness either to remove the covering from his head or to attend church wearing his hat. He would decline to take off his hat in court on the occasions when his expert testimony was sought, and the sole occasion on which a judge seems to have insisted that the doctor should be uncovered brought from Mettauer the suggestion, that if his evidence was essential to the cause, he would be pleased to give it with his hat on, and that if it were not so, he would be quite as well pleased to leave the court-room, meanwhile, of course, wearing his hat.

Dr. Johnston said that so great was his interest in seeing full justice done to the genius of Met-

tauer that he was seriously contemplating an extensive biography of the man.

DR. ALBERT VANDER VEER, of Albany, N. Y., read a paper entitled END RESULTS IN SURGERY OF THE KIDNEY, WITH A REPORT OF NINETY CASES, AND ONE HUNDRED AND TWENTY-THREE OPERATIONS.

This paper was based on a review of ninety cases occurring in the author's own practice. The next largest group was composed of movable or floating kidney. These numbered twenty-three cases, exclusive of those where incision of the capsule for neuralgia, examination for stone, and decapsulation for Bright's disease was done. Nineteen of these cases occurred in the female, about two-thirds of whom were married, the lesion being on the right side. There were four males, the lesion also occurring on the right side, and the entire number recovering; and one required removal of the kidney four years after for abscess of the pelvis and stone, with good recovery.

He next presented a series of twenty-four cases of nephrotomy in which there was a surgical lesion of the kidney, grouped under the heading of pyelitis, pyonephrosis, pyonephritis, or ascending pyelonephrosis. The series was divided as follows: Male, right side, two recovered, one died. Male, left side, six recovered. Female, right side, nine recovered. Female, left side, six recovered.

Nine of these cases finally required nephrectomy, one of the latter resulting in death. Of the remaining fifteen cases, all made good recoveries; but one of them, after a period of four years, had a slight sinus, not deep, with no pus, patient being in an excellent condition. The other patient recovered from the kidney complication, but developed a pelvic abscess, which is still draining, and she is gradually losing ground.

In the case of nephrectomies (lumbar) for hydronephrosis, there were eight, as follows: Male, right side, two recovered. Female, right side, three recovered. Female, left side, two recovered, and one died.

Regarding the removal of the kidney by the transperitoneal incision, the author stated that it was an exceedingly easy and convenient way of removing a large cyst or tumor, the patients doing nicely afterwards. Of these there were four cases.

He then cited two cases of hydronephrosis in young women entirely cured by simple aspiration.

Of nephrotomies, followed later by nephrectomies, there were nine cases, as follows: Male, right side, two recovered. Male, left side, one recovered. Female, right side, two recovered. Female, left side, three recovered.

All of these cases made a good recovery from the two operations, with the exception of two patients, one dying a few months after from multiple abscesses of the remaining kidney, and the other, while still alive, is gradually failing in strength.

The author had been greatly impressed with the study of tuberculosis of the kidney, as to whether the invasion occurred from below or from systemic infection. There were seven of these cases, as follows: Male, right side, one recovered. Male, left side, two recovered. Female, right side, one recovered. Female, left side, three recovered.

There was a total of eight cases of malignant growths in connection with the kidney, as follows: Sarcoma: Male, right side, two recovered, one dead. Male, left side, one dead. Female, right side, one recovered. Female, left side, one dead.

Carcinoma: Female, right side, one recovered, but died later from return of the disease.

Hypernephroma: Male, left side, one recovered. Of decapsulation of the kidney for nephritis, there were two cases recovered; results excellent.

Of traumatisms and injuries of the kidney, there were six cases.

Of cases of renal neuralgia, associated with suspected stone of the kidney, the author was not able to confirm his diagnosis by exposure of the organ. The entire group was made up of six patients, and in only one instance was the diagnosis confirmed by needling of the kidney.

The author then reported some irregular cases, and concluded his paper by reporting two cases of abdominal surgery which illustrated errors in diagnosis, in which the real trouble was with the kidney.

CONCLUSIONS

In a review of the cases presented, one was impressed with the very excellent results following the operation of fixation of the kidney. In the hands of all operators the mortality list was exceedingly small. The wearing of a bandage, with kidney pad, was exceedingly irksome to many patients, who gladly consented to surgical intervention when the prospects for recovery were so good.

The combined operation of nephrotomy, and nephrectomy later, for abscess of the kidney was appropriate for such cases as would not bear too long an operation, and where there might be a large kidney made up of multiple abscesses in such a way as to make manipulation of the organ quite difficult; simple drainage, however, benefiting the patient for a time, often causing a diminu-

tion of the mass to be removed later. In the purely cystic form of kidney, a true pyonephrosis, an immediate nephrectomy is proper in the majority of cases. It must be borne in mind that, following a nephrotomy or nephrostomy, a very fair number of cases recover without further intervention.

In a large pus kidney—multiple abscesses—there is always some danger in nephrectomy causing an infective peritonitis.

In traumatisms of the kidney, firmness and decision on the part of the surgeon are an absolute necessity. There is no other form of emergency surgery more exacting.

In cases of immovable or floating kidney, giving such marked symptoms that the surgeon is often led to believe that he has a stone to deal with, he must admit that our diagnoses are very far from correct, and the cases reported are disappointing by reason of not finding the calculus present.

The author said it was sometimes difficult to diagnose between a neuralgic kidney and one containing a calculus in its pelvis. Splitting of the capsule relieved pain in cases that could only be classified as a neuralgic condition.

It was yet a mooted question as to how much could be accomplished by resection of the kidney for the relief of abscesses and growths.

The cases of tuberculosis reported, manifested decidedly the importance of an early operation, and gave a most encouraging outlook for these patients regarding permanent recovery.

Malignant growths gave the mortality list, and yet there was much hope for these cases if reached early.

Surgery of the kidney was becoming more and more exact with the splendid advances made in methods of examination of the urine, whether coming from one side or the other, as to the possibility of one kidney being absent, or the case being one of horseshoe kidney, and as to the correctness of the lesion.

Errors of diagnosis would occur less frequently in the practice of abdominal surgery as methods of examination became more perfect.

The writer was particularly impressed with the oblique incision which has been employed in nearly all of his cases during the past ten years.

The one case of hernia reported, resulted from the old incision, parallel with the spine and transversely through the muscle, causing a lumbar hernia, but none of the others presented this complication.

As to the use of ligatures or clamps, if the pedicle was exceedingly short and difficult to ligate, clamps were advisable. Clamps were easily applied, and as used in the cases reported, results were excellent. There was no evidence of hemorrhage on removal, and the patient's convalescence was very rapid. When using ligatures the writer was reluctant to dispense with fine silk.

The cases of hydronephrosis yielding to aspiration were of interest. The possibility of such a result in these simple cases should always be borne in mind, and the treatment attempted. One could not overlook the fact that the proportion of diseased kidneys was so much greater on the right than on the left side. A differential diagnosis between gall-bladder lesions, the kidney, the cæcum, and its anatomical relations presented strongly in a paper of this kind. Surely, the right abdominal cavity was to be greatly respected.

It will be observed that in a total of about ninety patients there were one hundred and twenty-three operations done. This was readily accounted for because of the patients requiring more than one operation. The rate of mortality was very small, malignant disease and abscesses of the kidney being alone responsible.

Dr. William J. Mayo, of Rochester, Minnesota, asked the essayist whether he took out the ureter, or considers it necessary to do so, in cases of tuberculosis of the kidney. Furthermore, whether any of the cases in which nephrotomy for tuberculosis of the kidney was performed had been followed by permanently good results. Again, as to how early the cases he had had of tuberculosis of the kidney had developed.

Recently the speaker had gone over the history of some thirty-six nephrectomies for tuberculosis, and was much interested to find that a large number of people who are supposed to have tuberculosis of both kidneys in the early stage came to him without any symptoms that were referable to one kidney more than the other. They simply had a number of tubercle bacilli in the urine, with excessive urination at night. On careful examination it could be shown in the majority of cases, so far as his recent experience went, that the tuberculosis was confined to one side. He thought that in the majority of cases tuberculosis of the kidney was one-sided to start with; that his experience had been obtained largely from post-mortem examinations, and that at the time of death of the patient the second kidney had become involved. Therefore, he had post-mortem rather than living evidence in the early stages of an exaggerated idea of the percentage of cases in which tuberculosis of the kidney was double. James Israel, and those who had the largest ex-

perience in tuberculosis of the kidney, consider it necessary to remove the ureter. The speaker considered it bad practice to remove part of the ureter. It should be removed entirely down to the bladder, the end of the ureter being excised down to the bladder, and closed just as one would treat a pyosalpinx, by excising the horn of the uterus, or the ureter could not be removed at all. In a number of instances, both in his own cases and those operated upon by others, he found it necessary to remove the ureter secondarily for tuberculosis. He related this experience to show that surgeons should in every case remove the ureter *in toto* at the time of every operation.

Dr. N. B. Carson, of St. Louis, Mo., mentioned a case in which a diagnosis of floating kidney was made by several good surgeons, and he operated with the intention of fixing the kidney. He found the kidney slightly movable, but not floating. Later an eminent surgeon said the case was undoubtedly one of floating kidney, even though an operation had been done. The speaker reminded this surgeon that he had already operated and fixed the kidney. Later he operated again, and instead of a floating kidney, found a floating right lobe of the liver. The gall-bladder was enlarged to the size of the kidney. This was fixed to the liver. It contained a number of stones. The right lobe of the liver was so freely movable that the gall-bladder could be floated, so to speak, all over the abdomen, and it so corresponded to the shape of the kidney that every one who examined the patient made a mistake. The kidney was removed, and the patient made a good recovery.

Dr. Archibald MacLaren, of St. Paul, Minnesota, called attention to the ease with which a kidney could be removed after resection of the twelfth rib. He obtained this idea from Dr. Mayo, and in a recent case in which he had tried this, he found it easy to resect the twelfth rib, although he opened the pleura. The opening in the pleura was plugged with iodoform gauze.

Dr. Vander Veer, in closing the discussion, said, in reply to Dr. Mayo, that the tuberculosis was confined to one kidney in his cases. He had a history of these cases, and only one death that had occurred since the operation among that number. In regard to the operation of nephrotomy, there were two well-marked cases of tuberculosis in which it became necessary to remove the kidney, and the disease was confined to one side. He had no record of cases of bilateral tuberculosis of the kidney.

Regarding the removal of the ureter, to be frank, in the first two cases he operated upon he did not remove it, and of that number one relapsed, and he had to do a secondary operation. Of two other cases, one was treated by carbolic acid by direct application. These cases did well later on, and had no unpleasant results. Of late it was his practice to remove the ureter thoroughly, going down as low as possible, but not to the point of excision of a portion of the bladder. In those cases of nephrotomy in which we have relapse, the cases of tuberculosis that did not do well, another operation was called for, more thorough than the one in the beginning.

He had almost a duplicate of Dr. Carson's case of a sarcoma on the right side, which involved the gall-bladder and right lobe of the liver.

Dr. Lewis S. McMurtry, of Louisville, asked the essayist to elaborate one point in the technique, namely, if in suppurative cases the speaker leaves the ligature long, and his arrangement for its removal, or whether he buries it.

Dr. Vander Veer replied that in two of the cases reported he left the ligature long, just as was formerly done in amputating a thigh, and had no reason to regret it. Recently he had put in rubber drainage or gauze drainage, and had no reason to regret that. Silk had not given any disturbance, except in one case. In this it had to be removed later, because it was a continual source of suppuration. It was removed with a crochet needle, following which the sinus healed.

Dr. Emmet Rixford, of San Francisco, read a paper on Excision of Portions of the Chest Wall for Malignant Tumors.

Dr. N. B. Carson reported two cases in connection with Dr. Rixford's paper. The first was one of osteosarcoma, the result of recurrence, and involved the removal of the male breast. The patient was thirty-seven years of age, and presented himself with a tumor about the size of a fist, having its origin from the fifth and sixth ribs. He made an incision through the skin some distance from the tumor, dissected this free, uncovered the ribs, and opened them from the outer side. He did not follow the plan recommended by Dr. Rixford of avoiding the pleura, knowing that this was involved. He opened the pleura immediately, and, having first cleared the wound thoroughly, resected the ribs with the tumor, removing an area of about six inches or more. He was not as fortunate in this case as Dr. Rixford had been in some of his, because there was soon a recurrence, not only at the site of the tumor,

but in the scalp and other parts of the body. The patient lived almost a year, then died.

The second case was a child operated upon a year ago last June for tumor of the sternum, the middle portion of the sternum being involved by the tumor, and it bent forward, making the tumor appear much larger than it really was. He removed the third and fourth ribs, with the greater part of the sternum. The patient made a good recovery, and according to the last account was well.

Dr. Roswell Park, of Buffalo, N. Y., had experimented with the new pneumatic cabinet, but not on the human being, and after watching the results obtained in the laboratory by ordinary means was not able to convince himself that this device was superior, and he was not willing to try it on the human being yet.

He agreed with Dr. Rixford that it is unnecessary to have elaborate assistance in order to open successfully one side of the chest to do anything one needs to do. He thought it was possible to do one of the long transdiaphragmatic operations, making anastomosis between the esophagus and stomach through the diaphragm. It was possible to do this as a mechanical feat, but whether it was justifiable as a surgical operation was another question. He was very glad Dr. Rixford had announced himself as he did, that it was possible, feasible and practicable and humane even to do this sort of operation, when it needed to be done, without the necessity for any such elaborate architectural assistance as was afforded by the pneumatic cabinet.

Dr. F. W. Parham, of New Orleans, La., concurred in the statement of Dr. Rixford, that the use of the pneumatic apparatus was not an absolute necessity. He had previously reported three cases of resection of the chest wall for tumor, one of whom died a year later from recurrence and pneumonia. In a second case he carried out artificial respiration by the Fell-O'Dwyer apparatus, with foot leverage to work the bellows, and an O'Dwyer canula introduced into the larnyx. This case had lived now for seven years after operation.

A third case was operated on a little over a year ago, in which he attempted to carry out the same procedure, using the Fell-O'Dwyer apparatus. In that case it was impossible to retain the canula in the larnyx. He therefore removed the canula, and operated, which involved resection of the tenth, eleventh, and twelfth ribs, leaving only a small portion of the anterior ends running back into the bony section around the angle of the ribs. In this case the diaphragm was not involved, but was considerably crippled. He removed part of the chest, and had considerable difficulty in closing the wound. Finally he brought the lung down, and stitched it to the diaphragm, spreading it out like a piece of leather, with large cavity behind, and closed the wound, having absolutely nothing but skin to cover the wound. Patient recovered successfully from the operation, and to-day, fourteen months after operation, had no recurrence.

Dr. Rixford, in closing the discussion, said he had heard of Dr. Parham's work in this surgical field, but had not had the opportunity of reading his original article.

In the four or five cases he had had, three of the four patients were still living, and one had a recurrence. Two were free from recurrence, and one of these two was free from recurrence at the end of two years.

Non-Parasitic Cysts of the Spleen

Dr. Charles A. Powers, of Denver, Colorado, in a paper with this title, said that the subject had a twofold origin. First, the few and comparatively recent clinical reports. Second, somewhat more numerous accidental post-mortem findings. In September, 1895, a young man of eighteen was referred to him who presented a large, right-sided, abdominal cyst. The mass was of four years' growth. There had been a gradual loss of flesh and strength, anorexia, headache, and general pressure symptoms. Fluctuation was plain. The diagnosis of splenic cyst seemed positive. A free incision was made over the prominent part of the tumor, the walls of which were found to be about one-half of an inch thick, semi-cartilaginous and solidly adherent to all the adjacent structures. Extirpation seemed impossible. Later autopsy findings confirmed this. The single cyst held several litres. A posterior incision was made, with through drainage. The walls of the cyst did not collapse, and the patient died of septic absorption from the cyst wall on the twelfth day. The anatomical diagnosis was hemorrhagic cyst of the spleen. From the autopsy findings the author could not see how the cyst could have been successfully extirpated.

He presented a brief analysis of thirty-two tabulated cases.

In considering the treatment, he spoke of puncture, incision and injection, incision and drainage, marsupialization, resection of cyst, and splenectomy.

Dr. Roswell Park, of Buffalo, N. Y., followed with a paper entitled Status Lymphaticus and the Ductless Glands.

(This paper appears in this issue of Surgery, Gynecology and Obstetrics.)

Excision in Congenital Posterior Dislocation of the Humerus.

Dr. John B. Roberts, of Philadelphia, Pa., contributed a paper on this subject, in which he reported the case of a child operated upon for congenital subacromial dislocation of the head of the humerus. He had reported to the Association in 1895, a similar case occurring in a girl of ten years. In that case the parents declined operative interference, and the patient, who had now grown to be a young woman, still had the characteristic deformity and rigidity at the shoulder, due to inward rotation of the humerus.

The boy operated upon was three years of age and was subjected to excision of the head of the bone after ineffectual attempts to reduce the dislocation. Dr. Roberts was unable to reduce the dislocation, even after making a posterior and an anterior incision. The condition of the boy about eighteen months after operation is very satisfactory as far as the use of the arm is concerned. There was, however, as was expected, a shortening of the humerus, because of the removal of the head and interference with the growth at the upper epiphysis. This deformity, which is a rare one, he said, had been studied in recent years by Drs. Phelps, Scudder, and others. In some cases successful reduction had been accomplished.

Dr. George Tully Vaughan, of Washington, D. C., followed with a paper entitled Patent Urachus.

The author presented a review of the cases reported, and described an operation on a case complicated with stone in the kidney. He explained the defective development in embryology, which led to the formation of patent urachus and of Meckel's diverticulum. He stated that the older anatomists held different opinions as to whether the urachus was a tube or a solid cord. He divided cases of patent urachus into the complete, blind, blind internal, and blind external, and into congenital and acquired varieties; and explained the occurrence of some cases of acquired patent urachus by the pressure of urine in the bladder from obstruction to its normal outflow, causing Wutz's valve (a small valve which guards the bladder opening of the urachus) to give way, and permit urine to enter the urachus, when, if infection took place, abscess formed and pus broke through the navel or discharged into the bladder.

He sketched fifty-two cases reported in the literature, and added one case of his own. Of this number, thirty-eight cases were operated on, with thirty-two recoveries, three deaths, and in three the result was not reported. He divided the methods which have been tried for closing the open urachus into eight classes, as follows:

1. The application of caustic or of the actual cautery to the umbilical opening. 2. The use of the cautery and of ligatures or sutures. 3. The use of ligature or suture only. 4. Plastic operations—the application of a flap of skin to close the opening. 5. To open or slit up the urachus, curette or cauterize, and pack. 6. Removal of sources of irritation from the urachus, such as stones, pus, etc., and keeping the parts clean. 7. Removal of obstruction to the flow of urine from the bladder through the urethra, as a tight prepuce, strictures of the urethra, hypertrophy of the prostate, and tumors or stones in the bladder. 8. Extirpation or dissection out of the urachus, and sewing or ligating the part next the bladder, after the manner of treating the vermiform appendix in appendectomy.

He did not approve of the method of simply closing the umbilical end of the fistula, lest an infected suppurating area be left, which might cause septicemia or peritonitis. He considered splitting open and packing the abscess cavity a rational operation, but thought the operation of election was to dissect out the urachus with the entire diseased area.

Dr. Vaughan used this method on his case, a man of forty, who had an acquired patent urachus since the age of seventeen. A month after the patent urachus had been cured it was necessary to perform nephrolithotomy on the right kidney, and nine months later the same operation on the left kidney.

A short space was devoted to tumors and cysts of the urachus.

Dr. H. L. Burrell, of Boston, Mass., contributed a paper on A Summary of all the Cases of Fracture of the Spine (244) which were Treated at the Boston City Hospital from 1864 to 1905.

The author presented the following conclusions:

1. That fractures of the spine might well be divided into two classes: (1) fractures of the spine with injury to the cord; (2) fractures of the spine without injury to the cord.

2. That it was not best to decide what the treatment of an individual case of fracture of

the spine should be from the statistics, because the lesion varied so widely.

3. That in many cases of fracture of the spine it was impossible to primarily state whether the cord was crushed or pressed upon by bone, blood, or exudate, except by an open operation.

4. That only by the *persistence* of total loss of reflexes, complete insensibility to touch and pain, and motor paralysis below the level of the lesion could total transverse destruction of the cord be diagnosticated.

5. That if pressure on the cord was allowed to remain for many hours, irreparable damage to the cord might take place.

6. That unless it was perfectly clear that the cord was irremediably damaged, an open operation to establish the condition of the cord and to relieve pressure was imperative, as soon as surgical shock had been recovered from.

7. That in certain cases of fracture of the spine, when the cord was not injured, but was liable to injury from displacement of the fragments of a vertebra, rectification of the deformity and fixation of the spine might be used.

8. That if the cord was crushed, no matter what treatment was adopted, there would, of necessity, be a high rate of mortality.

Case of Suture of the Spinal Cord Following a Gunshot Injury Involving Complete Severance of the Structure

Dr. George Ryerson Fowler, of Brooklyn, N. Y., reported the case of A. E., aged eighteen, clerk, born in America, single. The patient was admitted to the Brooklyn Hospital on April 28, 1903. He gave the following history: He suffered from pneumonia several years ago. Four years ago, while working at a machine, his left hand was caught in the latter, and so badly crushed that it became necessary to amputate four fingers. He had gonorrhœa six months ago; no discharge at the present time. Shortly before admission he was shot in the back, his assailant using a 38-caliber revolver, at a distance of about thirty feet. The shooting took place somewhat from the right side. He suffered severely from shock, and paralysis of the lower extremities occurred at once. The bullet wound was located one and a quarter inches to the right of the median line, and on a level between the tenth and eleventh dorsal spines. He was found to be paralyzed below the waist. Sensation was absent over all of both lower extremities, and over the abdomen as high as one inch above the crests of the ilia on the sides, and about half-way between the symphysis and the umbilicus in front. Bladder and rectum were also paralyzed. The bowels moved involuntarily and irregularly, and without the volition or cognizance of the patient. There was considerable twitching of the muscles of both legs, especially the toes.

Operation, May 9, 1903. Ether anesthesia. An incision was made, six inches long, over the spines of the vertebræ, the middle of the incision resting upon the eleventh dorsal spine. The laminæ of the tenth, eleventh, and twelfth vertebræ were removed by the chisel. The bullet was found lying transversely between the severed ends of the cord, concealed from view by a large blood clot. A very narrow, ragged, and contused strip of dura, scarcely more than one-sixteenth of an inch in width, remained intact. The blood clot was carefully sponged away, and the bullet removed. The ends of the cord were then sutured with three fine chromicized catgut sutures, the dura being included in the sutures. No special difficulty was experienced in drawing together the ends of the cord and closing the defect, the latter representing in width the diameter of the 38-caliber bullet. The dura was further secured with a number of sutures of fine catgut, and a drain consisting of a half-dozen narrow strips of oiled silk protective introduced. The skin incision was sutured with silkworm gut.

On May 30th, the following note appeared on the hospital record: "Wound healed, upper line of anesthetic area from one and a half to three inches lower than before operation. Twitching of toes of both feet and occasional clonic muscular spasms of the flexors and extensors of the thighs; the patient says his 'feet jump up on him.' Can feel when the bowels move, but is without control of the rectum. Can feel distention of the bladder with urine, but is without control."

The main points of interest in this case related to the possibility of regeneration of the spinal cord following a destructive lesion. Prior to the report of Dr. F. F. Stewart's case, in which Dr. R. H. Harte sutured the cord after it was severed by a bullet, it was the opinion of the majority of investigators that such regeneration in man was impossible. Mikulicz, of Breslau, endeavored to demonstrate the possibility of a successful regenerative process in the lower animals following section of the cord, but without result. Spiller and Frazier found that after division of a posterior root in the dog, followed by immediate suture, regeneration occurred, and that regeneration into the cord did not occur.

In Dr. Fowler's case, twenty-six months after the injury, voluntary motion was practically

lost in the affected area. The patient was able to stand when supporting himself by the hands resting upon an apparatus, and to make some locomotion by swinging movements in a special frame on wheels. The bladder and rectum control was doubtful, to say the least, the former acting automatically. The patient had the sensation that the bladder and rectum were about to empty themselves, and if the urinal or bedpan were brought to him promptly, soiling was prevented. The amount of urine passed in this manner probably averaged more than a pint in the twenty-four hours. The urine was sometimes voided during sleep. Sensation was practically abolished in the entire affected region, with the exception of an area about five inches in length, extending down the outer side of the right thigh, where some sensation was present. He was not able to correctly distinguish between heat and cold. Tactile sensations were recognized, but were usually referred to a point two or three inches distant from the point touched. Marked rigidity and spasticity of both legs were present. Patellar reflex exaggerated; Achilles reflex marked. Ankle clonus present on one side and absent on the other. The reaction of degeneration was absent. Bed-sores developed in the third month; these extended to the muscles and were six months in healing. The skin showed but slight, if any, evidences of trophic disturbance.

A final and important comment was suggested in comparing this case with the Stewart-Harte case, namely: The Stewart-Harte case was operated on three hours after the injury, while in Dr. Fowler's case upwards of ten days had elapsed before consent to interfere operatively was obtained. The prolonged separation of the divided ends of the cord and the presence of the foreign body had, in all probability, an influence in preventing a complete regeneration of the cord, as occurred in the first case, provided, of course, that regeneration did actually occur. While the case in hand was, therefore, not as striking in many of its features as the Stewart-Harte case, the author thought it presented some points of interest, and for this reason was offered as a contribution to the literature of the subject.

Spine: Tubercular Conditions Requiring Surgical and Mechanical Relief

This paper was read by Dr. De Forest Willard, of Philadelphia, Pennsylvania.

He said that the principal surgical measures employed for the relief of spinal caries were: Laminectomy for paraplegia; forcible immediate straightening of the kyphosis; forcible gradual straightening; erasion of carious bone; wiring of spinal processes; evacuation of pus accumulations; long-continued fixation of the column; hygienic measures to prevent the necessity for operative interference.

1. Complete methodical and long-continued fixation of the spine in the position of hyperextension, with healthful surroundings in the sunlight, were the prime factors in securing new ossific deposit, necessary to replace the carious bone.

2. Laminectomy for paraplegia was advisable only after long-continued and patient treatment along the above-named lines from one to two years, since the prognosis, especially in children, under these conditions is favorable, and good powers of locomotion may be confidently expected. The operation was justifiable in selected cases, where the loss of motion and sensation were progressively worse, and the symptoms threatened life. If the tubercular masses within the spine could be removed, and if extradural pachymeningitic deposits or pus could be taken away, improvement might be expected, and in many cases relief would occur. The operation had a mortality of about 25 per cent from immediate shock; 36 per cent within a month; while one-half the cases within the next year, their lives being probably shortened by the operative procedures. Cases of non-improvement and death equal nearly 65 per cent.

3. Forcible immediate straightening of the kyphosis was an unsurgical and dangerous proceeding; it was liable to reawaken the tubercular disease, and to weaken the column.

4. Forcible gradual straightening by supporting the kyphotic area upon a pedestal was a valuable agent in relieving deformity. The weight of the shoulders and pelvis could thus be utilized as straightening forces, and the weight of the column thrown upon the posterior arches. In this position it was permanently fixed by plaster of Paris.

5. Complete erasion of the carious bodies of the vertebræ was an uncertain operation, in the dorsal region requiring section of ribs, with danger of wounding the pleura.

6. Wiring of the spinous processes had never been sufficiently tried to demonstrate its helpfulness.

7. Spinal abscesses which contained only liquefaction of caseation should be aspirated. When true pus had formed, aseptic through drainage was advisable.

The Surgical Treatment of Intra-Spinal Tumors

Dr. Richard H. Harte, of Philadelphia, said that the science of spinal localization was now so well developed, that it usually was not difficult to determine with accuracy the location of an intra-spinal growth. What was usually understood by the term tumor of the spinal cord was an extra-medulary but intra-spinal growth like a sarcoma, a fibroma, or a myxoma, giving no evidence of its existence, except by the symptoms of medullary pressure which it produced. There had been found records of 92 operations for spinal tumors, among which number 43 patients died, a total mortality of nearly 47 per cent. The nature of the tumor was recorded in 88 of the reported cases. It was sarcomatous in two-fifths of the whole number (37 cases); adhesions, thickenings, etc., held second place, with 11 cases. Then came echinococcus, 8 cases; fibroma, 6 cases; syringomyelia, 5 cases; endothelioma, 4 cases; psammoma, 3 cases; cyst, 3 cases; fibromyxoma, 2 cases; osteoma, 2 cases; and one each of myeloma, lipoma, lymphangioma, dermoid cyst, primary and secondary carcinoma, and one tumor of bone, whose nature was not stated.

The author reported an interesting case of paraplegia from Pott's disease, in which he resorted to laminectomy, with great improvement.

With very few exceptions, he said it was impossible to determine the nature of the tumor before operation.

He reported a case of dermoid cyst of the spinal canal on which he had operated, followed by recovery. The patient was a girl, seven years of age.

Of 82 cases in which the region of the spine affected was given, the upper dorsal region was involved in 33 cases, or over 40 per cent. The tumor was found in the lower dorsal region in 24 cases, in the lumbo-sacral region in 14, and in the cervical region in 11 cases. The cause of death was given in 28 cases; one-half of these were due to shock and hemorrhage, or to infection from meningitis, there being seven fatal cases in each of these categories. Eight patients died from exhaustion, 3 from recurrence of malignant growths, 2 from hypostatic pneumonia, and 1 from bed-sores and sepsis.

As regards the technique of the operation, he said it was essentially the same as when employed in traumatic cases.

Tumors of the Spinal Cord

Dr. J. Collins Warren, of Boston, Massachusetts, read a paper on this subject, in which he reported three cases of tumor of the spinal cord that he had operated upon with excellent results.

Dr. John C. Munro, of Boston, mentioned an interesting case of Pott's disease in which the pressure was due to a bony growth. The patient was a young girl, and was totally paraplegic and anesthetic for several years; but after removing this bony growth and relieving pressure, sensation returned within forty-eight hours, with considerable increased motion within a week. He said we ought not to feel discouraged in this class of cases. He thought it proved that very little was known actually as to the function of the cord as interfered with by pressure, as here was a girl, who for seven years had been under orthopedic treatment of all sorts, without any evidence of regaining her function, yet by removing the bony growth and relieving pressure, sensation returned within forty-eight hours.

As to the technique in these cases, it should be as simple as possible. All osteoplastic operations he considered dangerous and difficult; he spoke from an experience of over thirty operations of his own, and of probably twenty or thirty more in the hands of other surgeons, and said the simpler the technique the better. There was very little shock attending the ordinary operation.

Dr. N. B. Carson, of St. Louis, Missouri, stated that as his experience increased, he was more and more in favor of immediate laminectomy in cases of traumatism of the spinal cord. He cited three cases that had come under his observation. The first was the son of President Lincoln's Attorney-General who, while swinging in a hammock one day with his head inclined, met with an accident, in that the rope broke, he turned a somersault, and rolled down the hill. There was almost complete paralysis following the accident. The accident happened in the country. The patient was brought some distance by railroad to St. Louis, where the speaker saw him in consultation the second day after the receipt of the injury. Careful examination failed to determine any evidence of deformity. The only thing noticeable was an undue mobility of the head. An operation was declined in this case for the reason no decided or good result could be promised, and the patient in due course of time died. A post-mortem examination was made, and a dislocation found of the fourth cervical vertebra, without fracture, with pressure upon the cord. If a laminectomy had been done in this case, he was inclined to think the result might have been favorable, and if the patient

had not entirely recovered, he would certainly have been relieved, and life saved.

The second case was one he was called to see in consultation at the City Hospital, in St. Louis. The patient had been neglected, and he saw him some time after the receipt of the injury. Paralysis was not complete at first, but gradually increased. Two or three weeks after the receipt of the injury, when he saw the patient, he advised operation, which was performed, and it was found that the spinal cord had not been injured. There was, however, a fracture with pressure, and if the operation had been done and the bony pressure relieved, the chances were that the patient would have been entirely relieved. However, the operation, done as it was after degeneration had taken place in the spinal cord, resulted beneficially, although patient did not completely recover.

The third case was a man who, in driving upon a load of hay and passing under a doorway, stooped and the spine was caught, doubling him upon himself. There was complete dislocation. The tumor was marked, and he could have put nearly three fingers under the projection or tumor. There was complete paralysis of all parts supplied by the nerves from this region. He saw the patient within an hour and a half after the injury. He explained to him the dangers of an operation, and asked him what he wished him to do. The patient replied that he would sooner die than live in that condition. Patient was suspended and the dislocation reduced. Patient was immediately taken down from the suspension, placed upon a plane, and a plaster-of-Paris jacket applied. He went to the country in less than three months after the operation. A few weeks ago he saw the patient in perfect health.

Dr. Maurice H. Richardson, of Boston, desired to say a few words from the point of view of indications for operation. He had never felt so encouraged to explore the spinal cord as he had after listening to the papers. We could learn very little about the prognosis after operations upon the cord. In Boston there was a certain amount of reaction against the universal application of the rule, to open the spinal cord in all cases of broken back. He found that cases of broken back in the Massachusetts Hospital almost invariably did badly, and these patients were watched carefully through months of terrible suffering and finally death, until a reaction followed against operation in cases of traumatism of the cord. It should be remembered, however, that the results without operation in these cases were just as bad. The surgeon could not tell from thirty or forty, or even a hundred, cases what the prognosis was going to be. Therefore, another reaction had taken place, in which he shared, namely, that inasmuch as he did not know what had taken place in the cord, the surgeon was justified in finding out, and, as had been said, the danger of infection was no greater from operations here than from exploratory abdominal operations.

The advantage of such discussions was that surgeons returned home from such enthusiastic gatherings, and undertook with renewed hope operative intervention in cases which had seemed almost hopeless.

Dr. Dudley P. Allen, of Cleveland, Ohio, said that reference had been made to one division of cases in which the diagnosis and treatment were in doubt. While he shared the feeling of all those who had expressed themselves to-day of an increasing confidence in the operation of laminectomy in cases of traumatism of the spine, it must be remembered that there were some cases of traumatism of the spine which recovered without operation. He had had considerable experience in cases of this kind, and it had been his good fortune to see a number of cases, in which paralysis of both lower extremities and of the entire trunk had occurred, making almost an absolute recovery. In many other cases in which the symptoms were not so severe, absolute recovery followed, and this recovery had been secured by a method not mentioned by the speakers. This method consisted in placing the patient in bed on a hard mattress, with flat surface, raising the head of the bed twenty degrees, and using a Sayre apparatus, with pulley over the head of the bed, and with heavy weight, so that the weight counterbalances the tendancy of the patient to slip down to the foot of the bed. In patients on whom it was impossible to perform such operations as had been mentioned, his experience was that great benefit, and even cure, might be secured by placing patients in bed in the manner he had described, with extension attached to the head, so that the spine was in extension, and without the Bradford frame.

Dr. A. J. Ochsner, of Chicago, said that the history of these cases was so indefinite that it was of little value, but where it was definite, where paralysis occurred at once, or directly after the injury had occurred, there could be but two conditions—one that of pressure, and the other destruction of the cord itself. If the pressure was due to a dislocation, and if the disloca-

tion was accompanied with fracture or a displacement, if this could be relieved the paralysis would at once disappear. Then, if one could provide against a recurrence of the pressure by the method which Dr. Allen had described, or by means of a plaster cast described by Dr. Burrell, one could accomplish everything that could be done. If this could be done, then it seemed as if immediate operation was the only thing that was indicated because without it the patient was doomed. Provided the paralysis was simply due to pressure, with the relief of it the patient was almost certain to recover. In cases in which the surgeon definitely knew that paralysis had occurred slowly after the injury, it was doubtful whether an operation should be performed. The speaker had had a number of cases of that class which had recovered with treatment similar to that described by Dr. Allen. So much for the immediate operation.

He had operated in a number of cases late, and in none of them with benefit.

There was one point he wished to refer to in connection with Dr. Willard's paper. He spoke of the very great benefit that his patients had experienced after the use of what is known as the Goldthwaite frame. The principle of this frame was the same as that illustrated in the paper of Dr. Willard. It was very much better than the use of a sling, although apparently from the outside, simply looking at it theoretically, the result might be the same, but the result was entirely different, because in the Goldthwaite frame there were two malleable steel bars, which could be accurately adjusted, so as to have exactly the amount of pressure desired; and by placing a perforated felt pad over the projection, one could protect the spine absolutely, so that the benefit was greater than from the use of the Sayre suspension apparatus or of anything else that he had employed. The principle was the same, with the exception that the brace provided a continuous support.

Dr. George Tully Vaughan, of Washington, D. C., confined his remarks to injuries of the spine, saying that there were some cases in which it was best not to operate in fractures, dislocations, or injuries of the spine. It was very difficult to determine when and when not to operate. He had had a little experience which taught him that it was best not to operate in all cases. A man was struck in the back with a base-ball bat, following which there was complete paralysis of the lower extremities which lasted six or eight hours. The patient went to sleep, and he hesitated whether to operate in this case or not. The next morning the paralysis had completely disappeared. In this case, if he had operated within two or three hours, which was usually the best time to operate, the operation would have received the credit of the cure. On the other hand, there were cases in which undoubtedly operation was the proper thing. In every case where there was pressure on the cord, he thought the proper method, if we could exclude concussion, such as he believed his case was, was to resort to laminectomy. He would rather trust to that operation than to attempt to reduce a dislocation by any mechanical means. He believed the risk was less. He might be mistaken in this. He had had an experience comprising ten operations, four of them in which the injury involved the cervical region, the others the dorsal and lumbar regions. Of the four in the cervical region, three died of traumatism. Four or five cases which were not operated upon died within one week. The last case he had was operated on about three weeks ago by laminectomy. Patient was still living when he left Washington. The man sustained a fracture of the sixth cervical vertebra, followed by complete paralysis from the clavicle down, the case presenting the usual picture of paralysis following a broken neck. Of injuries in the lower part of the spine, two of them were below the spinal cord. These patients he thought would recover, as neither the bladder nor the bowels was permanently affected. They were paralyzed for a week, then the patients began to get control over them, and although their legs were paralyzed quite a long time, it was a month before any signs of motion or sensation returned. They were both recovering. He mentioned two cases of gun-shot wound of the spine, in which the cord was not touched by the bullet, but in one the ball passed through the lumbar vertebra in front of the cord, producing paralysis of motion, but not of sensation. The anterior root was affected. Unfortunately, the patients died two days after operation. He did not know why.

Of the list of ten cases he could only consider three as cured; that is, they did not die from operation. One lived ten months, and then died of acute intestinal obstruction. The paralysis did not improve. In the meantime, the patient had trouble with one kidney from obstruction and gravel. He operated, patient recovered, although he died finally from obstruction of the bowels. One patient with broken neck was still living and well, but he thought he would eventually die. These were the only cases he could count on as having recovered from operation.

According to his observation, cases of fracture of the cervical vertebra, with complete paralysis, were uniformly fatal. Courtney, of Boston, had collected fifty cases which occurred at the City Hospital in Boston, all of whom died within a month, some of them were operated upon, and some not.

Dr. James E. Moore, of Minneapolis, Minnesota, read a paper on Spina Bifida. (This paper appears in this issue of Surgery, Gynecology and Obstetrics.)

Dr. Roswell Park, of Buffalo, New York, had had a series of about ten cases of spina bifida, of which he preferred to speak of seven, because in these seven only did he carry out the principles described by the essayist. He had had better success with the implantation of foreign material as a protective than the essayist. He had used ivory and celluloid and silver, and only once had he to take out any of the material which he put in. Of these seven cases six recovered, and his results had been so satisfactory that he simply would add his seven cases to those which the essayist reported.

Dr. Emmet Rixford, of San Francisco, reported two cases of spina bifida upon which he had operated, both of them being young children. He operated upon one at the age of two weeks. The tumor was about the size of a turkey's egg. The patient was septic, and died from meningitis, two weeks following. The second case was brought to him from the country. It was a very large spina bifida, and had ruptured at birth. He operated at the end of twenty-four hours. It was a case of meningo-myelocele; there was fluid in the canal; nerve filaments were spread about the sides of the sac, and these were dissected away as carefully as possible; a very large redundant sac was trimmed away, and by the use of plastic work drawn together. The child was sent home the next morning, the parents being told that he saw no reason why it should not get well. Some months later he heard that the child had not only survived, but was thriving, except for the fact that it was developing a hydrocephalus. It was now some seven or eight months since the operation, and the last report he had from the family physician in regard to the case was that the hydrocephalus was rapidly disappearing. Whether it would disappear permanently or not was a question.

Dr. W. H. Carmalt, of New Haven, Connecticut, mentioned one case of spina bifida, which had some peculiar anatomical conditions worth recording. The patient was a child, two and a half years of age, brought to his clinic with a spina bifida, involving the lower portion of the spine and cord, about the lower lumbar region, with a tumor of about half the size of an orange; but projecting from the tumor was another bunch about as long as his finger, and of that shape, the end of which was exposed, with a red surface, looking very much like an exposed glans penis. From this surface there continually exuded a clear fluid. The child was taken to the hospital, the fluid collected, examined, and reported to be, as near as could be, the chemical constituents of cerebro-spinal fluid. He operated by making a longitudinal incision, dissecting out that portion which he supposed belonged to the inner membrane, dissected out the nerve, and returned the cord into the canal. The tumor itself was thickened, and consisted almost entirely of fluid that escaped without any untoward symptoms at the time of the operation. After returning the cord into the spinal canal, he sewed up the wound. There was no change in the symptoms after the operation; and although the exposed portion might be regarded as septic, he was careful to wash it off with boric acid, and take all the necessary precautions against active sepsis. There was no infection; the wound healed; the child remained in the hospital for some four months with no marked changes, and was then discharged. Some three months afterwards the child was brought to the hospital with a large slough over the sacrum and buttocks, which had come on from being exposed to the septic condition. The patient was the child of extremely ignorant Italian parents; the surroundings were of the most disagreeable character, and sepsis occurred from the scraping of the buttocks of the child over the floor as it crawled about in its paralyzed condition. The child eventually died of sepsis.

Dr. Roswell Park stated, with reference to the technique, that in these cases when the dura was exposed, he injected into the dural cavity a small dose of a solution of cocaine, not so much for the purpose of anesthesia as to simply quiet down the reflex activity, and not get any unpleasant effects from that source.

Dr. J. Collins Warren, of Boston, had operated on a number of cases of spina bifida, but could recall the end results of only three. The operations were done on infants, one under one year of age. He was able to follow the cases through different periods of time. In two there was hydrocephalus following; in the other there

was apparent recovery. His method of operation was to dissect around the sac without opening it, if possible, generally having opened it before the dissection was completed, and putting a ligature around the extent of the sac. He had noticed always in the cases he had operated on, the escape of cerebro-spinal fluid a few days after operation, and he felt inclined to put in drainage.

Dr. Carmalt mentioned, in connection with his case, that he found the opening into the canal small, and he was able to close it by fracturing the edges of the laminæ and bringing them together, thus succeeding in making a fairly firm closure of the opening, the opening consisting of the two lower dorsal, and a segment of the first sacral vertebræ.

The paper was further discussed by Drs. Willard, Fowler, and the discussion closed by Dr. Moore.

Exophthalmic Goitre Treated Surgically

Dr. Thomas W. Huntington, of San Francisco, California, read a paper with this title, and said that during the past three years he had treated surgically, nine patients suffering from exophthalmic goitre. In each instance partial ablation of one or both lobes of the thryoid was done, and one patient was subjected to three operations successively. Seven were females and two were males. The ages ranged from 28 to 56, the average age being 42 years. In 5 patients the development of symptoms of Graves's disease was associated with pre-existing enlargement of the thyroid. Two of these were cystico-colloid. In 4 the development of characteristic symptoms was simultaneous with glandular hypertrophy. All of these were colloid. In the 5 cases where the exopthalmic condition developed secondarily, pre-existing glandular hypertrophy was noted during a period of six, ten, thirty-four, thirty-five, and thirteen years respectively. In this series, exophthalmic symptoms were noted one, two, three, two, and two years prior to operation, the average being one and four-fifth years. Duration of symptoms in the primary or pure Basedow cases prior to operation was two years, three months, two months, and one year, the average being seven and one-quarter months. In this series eight patients survived the operation and were now living. One patient died on the twelfth day. The eight living patients were carefully watched, and their status definitely recorded up to date. The author gave a detailed account of each case as it occurred.

A wider experience in this particular field had increased the author's faith in the value of surgical interference in carefully selected cases, and in conclusion he repeated what he wrote in an earlier communication, namely, the argument for early operation in malignant disease applied here with equal force. Extirpation should be undertaken before destructive changes had occurred, before the function of important organs was seriously, perhaps permanently, injured, and the patient's vitality lowered by chronic thyroid intoxication.

A Review of Five Hundred Cases of Gastroenterostomy, Including Pyloroplasty, Gastroduodenostomy and Gastrojejunostomy

Dr. William J. Mayo, of Rochester, Minnesota, read a paper on this subject, saying that this included all the cases operated on by Dr. Chas. H. Mayo and the writer during fourteen years, in which an incision was made in both intestine and stomach, and plastic union established to increase gastric drainage. The mortality rate gave every case dying in the hospital without regard to the cause of death or the length of time after operation. Of pyloroplasty there were 21 cases, with no deaths, and 7 reoperations. Pyloroplasty had only a small field of usefulness. Finney's gastroduodenostomy, 58 cases, 4 deaths, 2 from other causes at a late date; only 1 death in the first 46. The author said that there was a large field of usefulness for this operation in narrow stricture following healing of ulcers, but it was less useful in unhealed ulcer.

Of gastrojejunostomy, there were 421 cases; benign, 307; death rate, 6 per cent. Last 140 cases, 4 deaths. Malignant, 114 cases; death rate, 18 per cent. In the last 40, including radical operations for cure of cancer, 5 per cent. Of Murphy button, there were 157 operations, 139 anterior, and 18 posterior. This was the operation of choice after pylorectomy and partial gastrectomy. McGraw ligature, 36 operations. This was the operation of choice by the anterior method in gastrojejunostomy for inoperable cancerous pyloric obstruction. There were 228 posterior suture operations. Of Robson's bone bobbin, there were 16 operations, with 1 death. Of Mikulicz operation, transverse incision, there were 43 operations, with 4 deaths and 4 secondary operations. Moynihan operation on nine-inch loop, 53 operations, with 3 deaths; 7 reoperated for chronic bile regurgitation within fifteen months. Of the Roux-Doyen operation, there were 48 cases, 2 deaths, 2 secondary operations. The operation of choice, in the judgment of the author, was the Moynihan-Peterson without a loop, made by suture within three inches of the origin of the

jejunum and obliquely on the posterior wall of the stomach, with the interior margin at the greater curvature near the junction of the pyloric end with the body of the stomach. Of the last 80 gastrojejunostomies for benign disease, there was only 1 death.

DR. DUDLEY P. ALLEN, of Cleveland, Ohio, read a paper entitled, A SIMPLE ASEPTIC SURGICAL TECHNIQUE.

The observations were based upon a series of 377 bacteriological examinations of the hands, made at the close of operation, and upon the clinical results obtained in 3,500 cases.

The bacteriological investigations were conducted in five series: In series "A" the cleansing of the hands was with soap and water, scrub-brush and nail-cleaner. The hands were then sterilized in Harrington's solution.

HARRINGTON'S SOLUTION: Alcohol (95 per cent), 640 c.c.; hydrochloric acid, 60 c.c.; water, 300 c.c.; bichloride of mercury, 0.8 gm.

In operating, the hands were encased in rubber gloves, in which was sterile water. Twenty-six observations were made by taking cultures from the hands at the close of operation. In each case the cultures were negative.

In Series "B" the washing of the hands was as in Series "A." On account of the irritation of the hands caused by Harrington's solution in Series "A," the hydrochloric acid was omitted from the solution in Series "B." Twenty-four observations showed that cultures were negative in each case.

In Series "C" the washing was as in Series "A," with the addition of thorough subsequent washing in 70 per cent alcohol. In forty-two observations the staphylococcus pyogenes albus was found in eight cases, or in about 20 per cent. The conclusion reached was that alcohol was not efficient as a disinfectant, and did not prevent the development of bacteria within the rubber gloves containing no germicide, but simply sterile water. From these observations it seems probable that if bacteria develop upon the hands sterilized by alcohol, when in gloves containing simply sterile water, they would develop in the same manner upon the hands prepared in the same way, if encased in dry gloves with powder, as the hands become moist with perspiration.

In Series "D" the hands were prepared as in Series "C," and then washed in a solution of bichloride of mercury, 1 to 5,000, and encased in rubber gloves containing the same solution. Sixty-four observations were made. All were negative except one. In this was found the staphylococcus pyogenes albus.

In Series "E" the hands were washed as in Series "A," and then thoroughly washed with a solution of bichloride of mercury, 1 to 5,000, and encased in rubber gloves containing the same solution. One hundred and two observations were made. The hay bacillus was found in one case.

In Series "F" the hands were washed as in Series "D," and then encased in a solution of bichloride of mercury, 1 to 3,000, and encased in gloves containing the same solution. Seventy-five observations were made. The staphylococcus pyogenes albus was found in a single case.

The clinical observations were made upon a series of 967 laparotomies. Of these, 687 were clean and 280 were septic before operation. There were 2,533 operations other than laparotomies. Of these, 1,452 were not septic before operation. This gives a total of 2,139 clean operations. For the purpose of study, the clean cases only were taken, since the question of asepsis evidently could not be studied in cases septic before operation.

In the results, cases of death from hemorrhage, shock, or similar conditions not associated with sepsis, and cases in which prolonged drainage was used, were excluded from the tables as having no connection with the discussion of the subject of aseptic technique. The results tabulated include all other cases of every kind. Cases were counted as septic in which there was but a single stitch abscess. In most cases the amount of infection was very slight, and did not in any way retard recovery.

Tables were presented showing the results obtained in all of the various series of operation, as in hernia, varicocele, varicose veins, and laparotomies of all kinds, and other miscellaneous operations. The results show in the whole series, of 2,139 clean operations, but two deaths from sepsis. Erysipelas developed but once. Stitch abscess occurred in 58 cases, or in about 2.25 per cent.

It was possible that a few cases of sepsis might have escaped record. It was also possible that in searching the records, a few cases might have been overlooked, but as the records were kept with more than ordinary care, and were carefully searched, and then revised, it was probable that the number of cases unrecorded must be very few.

The clinical results obtained were, except for the experiments recorded in Series A, B, and C, all secured by essentially the same precautions.

The method of cleansing the hands finally adopted was to wash them thoroughly with soap and water, using the scrub-brush for the palms of the hands, but only slightly upon the backs of the hands, and never upon the arms, the object being to avoid irritation of the integument. The nail cleaner was used only beneath the nails, and not around the basis of the nails. The hands and arms were then washed in a solution of bichloride of mercury, 1 to 5,000, and encased in rubber gloves containing the same solution. The belief of the writer was that the continued action of the solution of bichloride of mercury in the gloves was a fundamental safeguard in preventing the development of bacteria within the gloves during operation. That this was true in practice was shown by the results obtained in the large number of cultures taken at the close of operation.

The benefits of the gloves were twofold: (1) They absolutely prevented the contact of the operator's hand with the wound, and by filling the gloves with a solution of the bichloride of mercury the development of bacteria within the gloves during operation was prevented. If, therefore, the glove was pricked by a needle during operation, the escape of bacteria into the wound was avoided. (2) Gloves are of very great value to the operator himself. Whereas the writer had suffered very frequent infections of the hands from needle pricks, etc., before gloves were worn, in the long series of operations in which gloves have been used, there had not been the slightest infection of the hands at any time. The skin of the hands also had remained in excellent condition.

The study of the 58 cases in which stitch abscess occurred developed the fact that the suppuration was superficial in almost every case, and that in 35 of the cases the fact was recorded that chromicized gut was employed as a deep suture to unite the fascia, as it was commonly used in this way in laparotomies, hernias, etc. In 19 cases in which suppuration occurred, no record was made of the suture material, but beyond question a very large proportion of these cases were those in which chromicized gut was used. Suppuration occurring in cases associated with the use of chromicized gut was almost always at the site of the knot in the gut. It was usually of short duration, and ceased with the evacuation of the knot. The size of chromicized gut used was No. 3. It seemed, therefore, beyond question that the large knot was a source of irritation to the wounds, and that they became secondarily infected. That the infection was secondary rather than primary seemed probable from the fact that a series of cultures of chromicized gut was made, showing the gut to be sterile. Another fact pointing in the same direction was that the development of suppuration was usually after several days. Occasionally it occurred within the first four or five days, but the development of infection ordinarily did not occur until after a week or more.

In the first two-thirds of the cases operated upon antiseptic preparation of the field of operation was made the day before operation and a surgical dressing was applied. In the last third the patient received a tub bath on the morning of operation, was placed in clean linen, and the preparation of the field of operation took place upon the operating table. The operator and assistants wore sterilized gowns with short sleeves. Their heads were protected by linen caps. No shields were used over the face. Dressings and gauze sponges were sterilized once for thirty minutes, under fifteen pounds pressure, being wrapped in cotton cloth before being placed in the sterilizer. This covering was removed when the dressings were placed upon the operating table. During operation only sterile water was used.

The conclusions reached from the various series of cultures and clinical cases were: (1) That Harrington's solution, although efficient, was undesirable, since it caused marked irritation of the hands and arms. (2) That washing of the hands and arms should not be too violent, and that the use of the scrub brush should be confined to the hands. The arms should be washed by rubbing with gauze or a towel. (3) The use of the nail cleaner about the base of the nails was unnecessary. (4) Alcohol was not adequate as a germicide, when used upon the hands. (5) That a solution of 1 to 5,000 bichloride of mercury, used after washing, to disinfect the hands and arms, and then used in the rubber gloves, was thoroughly satisfactory in protecting against the development of bacteria within the gloves during operation. (6) That the rubber glove was a guarantee of safety, not only to the patient, but to the operator himself, when operating upon infected wounds. (7) That the mask over the face was not necessary.

CASE OF INTUSSUSCEPTION WHICH BECAME SPONTANEOUSLY REDUCED AFTER PROVISIONAL ENTEROSTOMY. (This paper will appear later in SURGERY, GYNECOLOGY AND OBSTETRICS).

DR. MAURICE H. RICHARDSON, of Boston, reported a case of intussusception in a boy of four. Vomiting and pain, with intestinal obstruction and a tumor in the left abdomen, suggested very strongly the diagnosis. The operation showed

an invagination of the small into the large intestine, so firm that reduction seemed impossible. The child's condition was so bad that an enterostomy was performed, in the hope that a cure would be effected by spontaneous sloughing of the invaginated gut, life meanwhile being maintained through the enterostomy. Unfortunately the child died at the end of eighteen days, the immediate cause of death being a purulent bronchitis. At the autopsy no trace of the intussusception could be found.

A careful search through the literature showed no case of spontaneous reduction of an intussusception in which the chain of evidence was absolutely complete. In this case the diagnosis, made before operation and demonstrated before the staff of the Massachusetts General Hospital and a large audience, was unassailable. The lesson taught by this case would seem to be that greater efforts should be made for reduction, either by hydraulic or air pressure through the rectum or by manipulations after the abdomen has been opened. In the author's experience, however, the results had been fatally compromised by just such efforts. It seemed, therefore, questionable whether in view of the great rarity of spontaneous reduction and of the almost universal failure of the milder palliative measures, one would ever be justified in selecting any but those operative measures which, undertaken at the earliest possible moment, could not fail to remedy completely and effectively disease.

Dr. Archibald MacLaren, of St. Paul, Minnesota, read a paper on Perforation of Gall-Bladder, with a Report of Ten Cases.

He said that gall-bladder perforations were comparatively rare, especially if observations were confined to ruptures due to violence, ulceration, and gangrenous inflammations. But if we added to these the cases of cholecystitis, in which inflammatory products had evidently escaped from or passed through the wall of an inflamed gall-bladder, even though we might not find the perforation itself, the number of cases was considerably increased. Such abscesses about the gall-bladder, either in the free peritoneal cavity or in the neighboring liver tissues, were rare as compared with appendiceal abscesses; but were not uncommon and unquestionably should be included when studying perforations of the gall-bladder.

Fistulous passages between the gall-bladder and duodenum, stomach, or colon were, of course, due to perforation of the gall-bladder. Most perforations of the gall-bladder occurred in neglected cases, where gall-stones had been known to exist for long periods of time and where the patient had had ample warning through many attacks of biliary colic.

Of Robson's 539 operations on the gall-bladder and bile ducts, 25 of the cases could be fairly said to be perforative in character. Dr. Mayo, in 328 cases, found 16 perforative cases. Dr. Ochsner, in 48 cases operated upon, found one perforation.

Case I. May,——, war veteran, sixty years of age, supposed to have chronic malaria, for which trouble he was sent to Minnesota twenty years ago. As a result of a gunshot wound he wore a wooden arm. Tripping one day on the street, he fell forward with his arm bent under him, so that the wooden fingers of the artificial arm pressed directly on his enlarged gall-bladder, and caused it to rupture. No operation. Post-mortem showed gall-bladder contained over 50 large-sized old black stones, and 12 ounces of pus.

Case II. Mrs. S., aged thirty-five; universal adhesions; a small, thick gall-bladder containing six medium-sized gall-stones. A hard nodule in the under surface of the liver was opened and found to contain a single stone.

Case III. Dr. De W., aged fifty, U. S. A. A small abscess between the colon and perforated gall-bladder was found. No gall-stones, but a perforation as large as a lead pencil was found on the anterior wall of the thickened gall-bladder. Gall-bladder drained; should have been removed, as fistula still exists. He was perfectly well while the fistula was discharging; but uncomfortable when it attempted to close.

Case IV. Mrs. J., aged thirty-five years. One large-sized gall-stone was found wedged into the cystic duct; the gall-bladder was filled with a thick, muddy, serous fluid; under the gall-bladder was a small puddle of the same thick fluid. No perforation. Drainage. Recovery.

Case V. Mr. A.; gangrene of the gall-bladder and quadrate lobe; drainage unsatisfactory; died from sepsis eight days after operation.

Case VI. Mrs. C., aged sixty-one years. Small contracted gall-bladder was found densely adherent to everything, especially to the duodenum, which showed a well-marked scar of an old perforation. Three stones in the common duct. Cholecystectomy and choledochtomy. Recovery.

Case VII. Mr. B., aged twenty-five years. Contracted gall-bladder adherent to all surrounding tissue, but no stones. A broad band of adhesions ran from the gall-bladder region down across both the duodenum and the transverse colon, markedly constricting them both. This

was divided and the gall-bladder removed. In removing the gall-bladder he opened into an abscess of the liver, which contained three ounces of thick brownish pus, just at the commencement of the cystic duct. Tube stitched into the stump of the cystic duct and drained the abscess cavity. Continued vomiting. Eight days later made a gastro-enterostomy by Mayo's latest method. Stopped vomiting. Perfect recovery.

Case VIII. Mr. C., aged forty-five. Abscess which extended from the edge of the liver to the line of the umbilicus, and contained a quart of bile-stained pus. Bladder, filled with stones, could be felt in upper wall of abscess cavity. The abscess was drained for four weeks. Operated again and found a universally adherent, small, contracted gall-bladder, containing thirty gall-stones and no bile. Subdiaphragmatic abscess; opened through the diaphragm; fully eight ounces of thick offensive pus. Drainage. Seven days after operation patient discharged two gall-stones from the abscess. Recovered.

Case IX. Mrs. C., aged thirty-two. Exploration demonstrated abscess adherent to anterior wall, containing six ounces of thick pus and six gall-stones. Discharge for three weeks. Recovered.

Case X. Miss C., aged 32. First operated upon in Rochester by Dr. W. J. Mayo. A large abscess was opened in the gall-bladder region, which in a few days discharged five large and twenty small gall-stones. Four years later Dr. MacLaren separated extensive adhesions to the gall-bladder and liver, and removed five old black stones from gall-bladder and drained it. Recovered.

He had operated upon 80 gall-stones cases, 9 of which were perforative in character, and 1 post-mortem, making a total of 10, which seemed a large proportion as compared with other lists of cases already on record. There were 8 recoveries and one death. In this fatal case he believed that the result would have been the same, even though the gall-bladder had been removed, because with gangrene of the gall-bladder and neighboring liver tissue, and especially in the presence of a localized abscess, any operative work which disturbed the abscess wall would only have spread the infection and lessened the chance of recovery. He believed that in any perforative case which had gone on to the formation of a localized abscess, the wisest course was to open and drain the abscess, waiting until a later time to deal with the gall-stones or the disease of the gall-bladder.

Dr. A. J. Ochsner, of Chicago, Illinois, read a paper entitled Constriction of the Duodenum Below the Entrance of the Common Duct, and its Relation to Disease.

In a series of cases operated for the relief of cholecystitis, it was found that there was frequently present a constricted condition of the duodenum just below the entrance of the common duct. This was usually accompanied with dilatation of the duodenum above this point. The dissection of a number of cadavers demonstrated the fact that there was present a marked increase in the circular muscle fibres of the duodenum, beginning at a point from one to three centimeters below the entrance of the common duct, and extending for a distance of one to four centimeters, forming a broad sphincter. It seemed likely that this sphincter had much to do with the physiological function of the duodenum, facilitating the mixing of chyme with bile. It also seemed likely that this sphincter served the purpose of establishing a condition of rest in this portion of the alimentary canal in case of irritation of the biliary or pancreatic ducts.

The paper was fully illustrated and the author gave a tabulated list of fourteen cases of dilatation of the duodenum, which he had encountered among his patients operated for the relief of gall-bladder disease.

Officers. The following officers were elected: *President*, Dr. Albert Vander Veer, Albany, New York; *Vice-Presidents*, Dr. James E. Moore, Minneapolis, Minnesota, and Dr. John C. Munro, Boston, Massachusetts; *Secretary*, Dr. Dudley P. Allen, Cleveland, Ohio, re-elected; *Treasurer*, Dr. George R. Fowler, Brooklyn, New York, re-elected; *Recorder*, Dr. Richard H. Harte, Philadelphia, Pennsylvania, re-elected. Cleveland, Ohio, was selected as the place for holding the next meeting, the time to be fixed by the Committee on Annual Meeting.

SYMPOSIUM UPON LACERATIONS INCIDENT TO LABOR

FROM THE TRANSACTIONS OF THE ILLINOIS STATE MEDICAL SOCIETY, MAY, 1905

DR. CHARLES S. BACON read a paper entitled IMMEDIATE DIAGNOSIS AND TREATMENT OF LACERATIONS OF THE VAGINA AND PELVIC FLOOR AND PERINEUM.

A practical classification was made of tears as external and internal. In both were many grades and either might be simple or combined with those of the other class. Diagnosis concerned both the finding of these lacerations and determining their extent and importance. Both touch and inspection were employed. The pain caused could be disregarded, but the risk of infection was considerable, and should be carefully considered. Hirst's proposed delay of all examination and operation till the end of a week was, however, not practicable, and the author favored immediate examination and repair, but only with as careful asepsis as would be employed in a secondary operation.

In a non-operative labor, when there was no hemorrhage with the expulsion of the head and no severe external tear, there would be no internal laceration and an internal examination was unnecessary.

Hemorrhage occurring during the latter stage of expulsion of the head was an indication of an internal tear. When this vaginal hemorrhage occurred, or after any operation, or when there was a considerable perineal tear, an internal examination should always be made to determine the presence and extent of the internal laceration. If it was probably slight, the examination might be made with the patient on the bed with hips elevated. A lamp furnished the best light and if the patient was across the bed a head mirror should be used. A large retractor and tampons to protect the field were necessary. When the third stage was prolonged the cord might be cut short and the examination and even repair made before the expulsion of the placenta.

Hemorrhage was rarely an indication for operation in vaginal and perineal tears. The bad results of unrepaired lacerations was generally the reason for operation. Spontaneous repair was a delusion.

Proper preparation was very important in all repair operations. They should be made on a table and not on the cross bed. The internal tears should be closed with either continuous or interrupted catgut sutures that would live two weeks. The divided ends of the torn levator ani muscle should be included with the suture. This method was not as good as that of Harris who sutures separately the torn ends of the muscle, but was easier to perform and would give good results. Care must be taken that no pocket outside of the vagina be left for blood and secretions.

Especial attention should be given to vaginal lacerations that involved the pelvic diaphragm and extended into the central attachments of the accessory diaphragm, but did not involve the skin surface. Here the skin bridge might be cut and the repair made as in a combined vaginal and perineal laceration, or the internal suture could be applied so as to bring in apposition the divided structures.

The perineal sutures of silkworm gut must not be tied too tightly. In a complete rupture the method of restoring the rectal tube by passing the suture through the rectal mucous membrane was preferred to the passing of the suture from the perineal side.

The author preferred cutting the ends of the perineal sutures short, and discarded powders. Catheterizing was unnecessary. A broad, occlusive dressing, fastened by the four corners to the abdominal bandage, was much better than the ordinary dressing held by the T-bandage.

Chief stress was laid on attention to details in preparation for and technic of operation, without which poor results and total failures furnished grounds for discarding immediate operations.

DR. L. H. A. NICKERSON, of Quincy, followed with a paper on DIAGNOSIS AND TREATMENT OF LACERATIONS OF THE VAGINAL PORTION OF THE UTERUS AND FORNIX VAGINÆ.

The author stated that there is little more to be said about laceration of the cervix since the day that Emmet first operated for a bilateral lacerated cervix, November 27, 1862, followed by a paper read before the New York State Medical Society, September, 1874.

Immediately after the accident occurs, arterial hemorrhage may be so profuse as to demand prompt action to control it. Only in this condition would the author advise a primary operation. The accoucheur should neither feel nor look for suspected laceration of the cervix except in cases of excessive arterial hemorrhage, as then there are chances for infection. An examination may do more harm than the laceration, which

may be simple and heal spontaneously. While the city doctor, with hospital accommodations and great equipment, may say operate at once, in order to save the patient the evil consequence of future endometritis, metritis, subinvolution, and displacements with all their varied symptoms, and probably carcinomatous degeneration of the cervix, the country doctor should hesitate about taking such radical advice, as the author thinks the danger of septic infection is too great. In addition, the parts are soft and flabby; the laceration may be ragged and irregular, with projections of lacerated tissue. Moreover, the chances of failure are great. This demoralizes the patient for a future necessary operation. A densely packed sterile tampon with a snugly fitting T-bandage may be sufficient to arrest the hemorrhage and enable the operator to select the operative time for the lacerated cervix within about ten or twelve weeks. In this day of exact science and successful midwifery, the accoucheur should not subject his patient to the danger of infection by a rigid examination directly after labor, but all cases should receive his careful examination some six weeks following delivery to discover any lesion of the pelvic organs.

The author discussed the causes, symptoms, and diagnosis of these lacerations.

In considering the treatment, he stated that prophylaxis consists in abstaining from the application of the forceps before the cervix is fully dilated; from the use of ergot; from pressure on the fundus and titillation of the os; from all measures calculated to hasten the second stage of labor. On the other hand, one should favor the use of drugs that cause dilatation, such as chloral and belladonna. Fresh tears that do not bleed, may be treated with antiseptic vaginal injections and subsequently pledgets of glycerite of tannin, a dram to the ounce, placed in contact with the os, the dressing changed twice a day.

As to the prognosis, the author says that many cases of lacerated cervix heal spontaneously, and give rise to no pathological conditions. Sometimes tears that have healed give rise to all those nervous symptoms due to the pressure from the newly formed cicatricial tissue. In neglected cases of laceration the whole system suffers and the patient becomes a wreck. Cancer of the cervix may develop, with all of its evil consequences. Cases, when properly treated and operated upon at the opportune time, escape all the above pathological conditions of endometritis, metritis, and subinvolution.

The essayist described the preparatory treatment and technic of the operation for the repair of these lacerations, the steps of the operation being illustrated by diagrams. The operation described was essentially that pursued by Emmet in these cases.

Finally, the author states that the effect of the operation for a lacerated cervix, both locally and as to general health, is often wonderful. The subinvolution, nervous symptoms, neuralgic, and reflex pains disappear. The patient gains in flesh, becomes cheerful, happy, and in a short time is fully restored to health. She may subsequently become pregnant, and delivery at full term is accomplished without a tear at the new line of union.

DIAGNOSIS AND TREATMENT OF RUPTURE OF THE UTERUS. By Dr. George Schmauch. (This paper will appear later in SURGERY, GYNECOLOGY AND OBSTETRICS.)

DR. THOMAS J. WATKINS, of Chicago, thought Dr. Nickerson had exaggerated the importance of lacerations of the cervix. The symptoms Dr. Nickerson gave as due to lacerations of the cervix were not the symptoms, in his opinion, of that condition, but were those of coincident diseases. For instance, endometritis was not a symptom of laceration of the cervix, but of germ infection. The same was true of metritis. Erosions of the cervix, which had been attributed to lacerations of the cervix, were more frequently due to infection than they were to tears. Extensive tears were seen without any erosion of the cervix; and erosions of the cervix were seen in virgins. Cervical erosion was due usually to an irritating discharge, an endometritis, the same as one noticed an erosion on the abdomen in a case of intestinal fistula. The erosion was not due to the wound in the skin, but to the irritating discharge from the bowel. Again, lacerations of the cervix did not produce reflex symptoms. Scar tissue in the cervix had ceased to be of much importance in gynæcology, consequently as a result of laceration of the cervix there were two conditions left—erosion and glandular degeneration. The glandular degeneration was the result more of infection than of tear, because the glandular degeneration was due to a closure of the mouths of the Nabothian glands. This closure was usually the result of inflammation or infection.

The indications for operation should be confined to two. (1) Extensive tear, attended by marked erosion, but before repair was undertaken for the erosion, the endometritis should be treated. (2) Occasionally a marked glandular

enlargement of the cervix might call for an operation or trachelorrhaphy. As a student of Emmet, he was prejudiced somewhat as to the importance of lacerations of the cervix.

Dr. Henry P. Newman, of Chicago, emphasized the indications for repair of the cervix. One should remember that the gynæcologist did not operate, as a rule, for the primary tear in the cases that came to him, as they required operative work of a much more extensive character. He operated for the crude pathology. True, the primary tear was a causal factor, and if it were corrected primarily, probably there would be few or no indications for the operation. But when one did operate on these cases there was something more to be done than to sew up a lacerated cervix. There was infected tissue to be removed. The pathology that existed should be corrected. The undenuded surfaces along the anterior and posterior portions of the cervix should be removed for the preservation of the canal. We should not leave behind tissue that was involved more perhaps than any other part of the cervix, namely, the anterior and posterior lips. In these cases these portions were irritated, very much enlarged, everted, the glandular tissue involved deeply, and to leave such tissue behind would serve as a menace to the restoration of the case; consequently operative work that contemplated the reconstruction of the cervix was essential, taking away the infected or involved area, restoring the part to as normal condition as possible, and leaving it so that it could functionate properly and be free from infection and subsequent pathological changes. Tracheloplasty was appropriate for such cases, as it carried with it all of the indications of a plastic operation upon the cervix, fitting each operation to the individual ase, and not having any classical method of handling all cases.

Dr. M. L. Harris, of Chicago, emphasized the importance of muscular tissue entering into the formation of the pelvic diaphragm, for the reason that there was a tendency of late among some gynæcologists to lay particular stress on the fascia. The pelvic diaphragm was in almost as constant motion as the great abdominal diaphragm; it descended and rose with every descent and ascent of the abdominal diaphragm. There was no instance in the human economy where a weight was sustained, or pressure or tension, continuously by fibrous or connective tissue. It was invariably held and maintained by muscular tissue; consequently we could not expect that the weight which always came constantly on the pelvic diaphragm could be maintained by fascial tissue. The importance of restoring the muscles to as near their normal condition as possible following laceration of the cervix could not be too much insisted on, and if obstetricians followed the advice of the essayists in connection with repairing these tissues immediately after labor, there would be less operating necessary subsequently.

Dr. Denslow Lewis, of Chicago, stated that in considering immediate operation in obstetric cases, the possibility of infection should be borne in mind, which in itself was very serious, and a more important factor to be thought of than the injury itself in many cases. It was his practice, after a woman was delivered and the uterus was well contracted, to have the nurse pass her hand upon the uterine tumor above the pubes and to pull downward for half an hour or an hour to make sure that there was no undue hemorrhage. This prevented post-partum hemorrhage, and if there was any undue hemorrhage from the vagina, with the uterus well contracted, it was an indication of the advisability of examination, and in such cases it was his custom to place a woman on the side, to insert a Sims speculum, and examine the cervix. He had found by this method that in many cases there had been a laceration of the cervix sufficient to occasion considerable and perhaps a dangerous hemorrhage. He then thought it advisable to disregard the danger of infection which was attended to before and after examination, and repair the cervical laceration which gave rise to the hemorrhage only in such cases. But in other cases, where the hemorrhage was insignificant, and the uterus well contracted, he did not think it was justifiable to inspect the cervix. The same statement did not apply to the perineum, which should be carefully inspected after every labor, and when it was torn, and the mucous membrane was torn on the posterior or anterior wall, it was the part of wisdom to make immediate repair, not because the perineum was needed to sustain the uterus, but because injuries of the vaginal mucous membrane were additional doors of entrance for pathogenic bacteria, and might be the cause of infection. For that reason it was his custom in all such cases, where he found a laceration on either the posterior or anterior vaginal wall, to insert a Sims speculum, begin high up with a catgut ligature, and with continuous suture close the laceration either on the anterior or posterior wall as the case might be. If the latter was torn, with the pelvic aponeurosis and the levator

ani muscle, something more than one continuous suture was required. In such cases it was sometimes advisable to make use of two or three layers of sutures, and he made sure in all such operations to bring together the fibers of the levator ani muscle and the aponeurosis, which was immediately connected with it, being reminded by Goldspohn's experience that the best method of operating on a perineum was to restore the fibers of the levator ani muscles, and the torn portions of the pelvic aponeurosis were brought together by catgut sutures. In some cases three or four layers of sutures were taken, and the skin surface was brought together. In this way the perineum was restored and the possible door of entrance for pathogenic bacteria was closed.

Dr. Emerson M. Sutton, of Peoria, alluded to the time of keeping patients in bed after operations for lacerations of the cervix, which he said we were told was somewhat a preventive of cancer. Lacerations of a severe degree should be repaired early, because at the time of the menopause there was a tendency to malignant disease. Patients might have the cervix repaired and be able to sit up in a short time. He had used chromicized catgut in these operations for the last four or five years, and said it had given better satisfaction than silkworm gut sutures. In order to make the catgut last longer, both in cervical and perineal repair work, he used an alum douche, which had a tendency to prevent the accumulation of foul secretions.

As to repairing a lacerated perineum immediately after labor, he thought it depended altogether on the physician. He had seen the perineum repaired by physicians who were afraid that patients would consider them guilty of malpractice if they did not do so, yet they did not have the requisite skill to repair a cervix or perineum as it should be repaired. In such cases the woman should be operated on for these lacerations later. But if physicians had the ability and skill to repair them, it was an easy matter to do it.

Dr. Nickerson, in closing the discussion on his part, said that if there was no tear in the uterus, we would not likely have infection. If there was no tear in the cervix, it was not likely that the woman would have either endometritis or metritis. If a woman had a tear of the cervix or perineum, it need not necessarily be repaired, but many tears became infected, producing other pathological conditions, and it was the part of wisdom to repair such lacerations in order to guard against infection or the production of other pathological processes. If, for instance, there was a laceration extending into the fornix vaginæ, it left a surface which could be easily contaminated. Should we permit a woman to run the risk of becoming infected by not repairing such a laceration? He did not think so. All cervices that were lacerated to any great extent should be repaired.

Dr. Bacon, in closing the discussion, said, in regard to the indications for operation mentioned by Dr. Lewis, repairing even a slight laceration for the purpose of preventing infection, there was undoubtedly something in that, and even if we had not a large wound there was always considerable retraction, and there was not a normal surface. The point should be considered that a laceration in four cases out of five was larger than one anticipated.

In regard to the douche, the danger of introducing any foreign substance that exerted an action on the tissues was now recognized as harmful. Bichloride of mercury, for instance, will interfere decidedly with the physiological function of the mucous membrane of the vagina and of other tissues. An artificial contamination of the vagina was known to disappear within twenty-four hours, because of the normal bactericidal secretion of the vagina. If, previous to this artificial contamination, a vaginal douche had been given of bichloride of mercury or some other agent that injured the tissues, then it would be two or three times as long before the contamination disappeared, and this was the reason why one should be careful about using a douche. The best douche was normal salt solution.

What Dr. Sutton had said about the operation depending upon the skill of the physician was very true. The speaker had this matter brought to his attention two or three years ago, when he had as a patient a woman who had formerly been a trained obstetric nurse for many years before she was married. One day before her confinement he talked over the question of preparation with her. She begged him not to make any repair operation, because she said it was her experience from the cases she had nursed, such operations were always failures, and she was afraid of such a result in her own case, should an operation be undertaken. This, he thought, did not exaggerate the average experience of physicians.

He had no doubt that many patients would get along better if they were not douched.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF SURGERY

UNDER THE CHARGE OF

JOHN B. MURPHY, M. D. — E. WYLLYS ANDREWS, M. D
FREDERIC A. BESLEY, M. D. — WM. R. CUBBINS, M. D

"CASUISTISCHE BEITRÄGE ZUR BEHANDLUNG DER DIFFUSEN EITRIGEN PERITONITIS." (Results of the treatment of diffuse purulent peritonitis.) Von P. Clairmont und E. Ranzi. *Archiv für Klinische Chirurgie*, Bd. 76, 1905, pp. 68.

In this contribution, which includes a discussion of the bacteriology, symptomatology, and treatment of the subject in general, Clairmont and Ranzi report the results of the treatment of the cases of diffuse purulent peritonitis that came to the First Surgical Clinic at Vienna, from 1901–1904. The communication, which comprises forty-one cases of all etiologies, is justified by the knowledge that an early operation can help, and that the majority of the cases were brought too late for a successful outcome.

There were twenty-five cases of diffuse purulent infection of the peritoneum after appendicitis. Fifteen of the cases ended fatally. The cases occurred at all ages, the majority, eighteen, falling in the first thirty years. The remaining seven were in people of advanced age; and all but one of these had a fatal termination.

The best results were shown in those patients between twenty and thirty years of age, for five out of these eight got well. Fifteen of the twenty-five developed peritonitis after a first attack of appendicitis, while in the other ten, repeated attacks had preceded. In the twenty-five instances; the starting-point of the peritoneal affection was a perityphlitic abscess in eight, perforation in fourteen, and a gangrenous appendix in three. The latter were all fatal; those coming from perforation were more favorable results than those from the abscesses. Of these cases that came to operation within two days, half were saved, while all that came after that time died.

After perforation of the stomach there were six cases, fifty per cent of which died. Three patients were between forty and fifty years, and three before and after those ages. One case occurred with carcinoma and the rest followed ulcer.

There are two instances where the peritoneum was invaded after a duodenal perforation. The laceration was both times in the horizantal position of the duodenum. Both patients died. One of these cases is of interest, since the infection was of pure pneumococcus origin.

After cholelithiasis there are two cases, with one death, one showing a rupture of the gall bladder, and the other without any break.

Only one case is reported of diffuse peritonitis after the rupture of a parametric abscess, and with fatal outcome. This case seemed favorable, but the examination of the exudate gave a pure culture of the streptococcus, which accounts for the fatal issue.

One case, with fatal outcome, occurred after replacement of an incarcerated hernia. Death resulted from volvulus after operation.

Four highly instructive cases of peritonitis after trauma are included. One man was kicked in the abdomen, with resulting perforation of the intestine near the ileocæcal valve, and death followed. A second patient fell upon a fence, the sharp point entering close to the anus. Operation was done within eight hours, and recovery resulted. There was beginning peritonitis. The third case was stabbed in the abdomen, and had a lethal ending. The last instance was one in which a man was kicked in the back, and, in falling upon the pavement, upon his abdomen, he perforated the small intestine near the ileocæcal valve. The rupture may have been induced by a large inguinal hernia, which was present.

Three cases of traumatic perforation of the stomach by bullets, and not included in the above forty-one, are appended. Two of these recovered, the lethal ending in one being due to a peptic ulcer, which developed at the margin of the sewed up wound, and then ruptured.

The authors speak very highly of thorough and frequent washings of the abdominal cavity with nine-tenths per cent Na. Cl. solution.

ANKYLOSIS. By Dr. J. B. Murphy. *Journal of the American Medical Association.* May 20, 27, and June 3, 1905.

Ankylosis is a generic term and does not represent a pathological entity. It may be due to varied pathological conditions, which may involve many different tissues, either separately or combined.

The different varieties of ankylosis, as regards the tissues involved may be classified as follows:

- Ankylosis (True and False.)
  - Periarticular
    - Capsular
      - Tendinous
      - Tendovaginal
      - Muscular
    - Extracapsular
  - Articular
    - Synovial-Fibrosis
    - Cartilaginous
    - Osseous

The most serious type is that in which the synovial membrane and cartilage have disappeared, and in which osseous union has taken place between the opposing bone ends.

The three varieties of the articular type will more particularly concern us in this paper.

The different forms of arthritis which may lead to the above-mentioned varieties of ankylosis may be conveniently classified in the following manner:

ARTHRITIS

- a. Primary hematogenous fibrous arthritis
- b. Dry fibrous arthritis. Non-traumatic
- c. Traumatic fibrous arthritis
  - With fracture into joint
  - Without fracture—contusion
- d. Suppurative
  - Hematogenous
    - Cryptogenic
      - Typhoid
      - Scarlatina
      - Pyemia
    - Metastatic
    - Traumatic
      - Gonorrhœa
  - Extension
    - Osteitis
      - Tuberculous
      - Osteomyelitic—Infective
    - Periarthritis—Phlegmon
    - Panarthritis
- e. Ossifying arthritis. Primary
- f. Static adhesive

The primary hematogenous fibrous arthritis is usually ushered in with a chill, followed by intense pain, tenderness in the joint, and high fever. There is only moderate effusion into the joint cavity. The course of the disease extends over many weeks, or even months, and terminates in fibrous ankylosis and agglutination of the capsule. In the dry fibrous arthritis there is pain on motion, gradually developing limitation of motion, but no temperature as a rule, and no effusion. The traumatic fibrous arthritis rarely follows fracture and occurs most frequently in the shoulder, elbow, and knee, as a result of contusions. Usually there is no pain for a week or ten days after the accident. The limitation of motion becomes more and more marked until at the end of ten or twelve weeks ankylosis may be complete. The suppurative type of arthritis most frequently results in ankylosis. In the cryptogenic variety there occurs an acute purulent inflammation of the joint without any apparent primary infective focus. This form also occurs as a metastatic process in typhoid fever, scarlatina, and pyemia. The hip joint is the one usually involved in typhoid and scarlet fevers, and the destruction of the joint may be so extensive that luxation follows. The pyæmic forms usually result fatally, but if the patient survives the process terminates in bony ankylosis. Following gonorrhea there are three types of arthritis—the chronic, extending over months and even years; the acute and sub-acute serous varieties. The chronic variety is often followed by an adhesive synovitis; the acute and sub-acute often terminate without ankylosis. If mixed infection takes place, suppuration develops and leads to fibrous or bony ankylosis.

The traumatic suppurative form may be due to penetrating or non-penetrating injuries. In the latter form the arthritis is usually secondary to a traumatic osteo-myelitis.

Osteitis of the tuberculous type is a common cause of ankylosis. The tuberculous focus in the bone perforates into the joint and sets up an arthritis which leads to a destruction of the joint tissues and fibrous or bony ankylosis.

Osteo-myelitis in the epiphyseal end of the bone not infrequently infects the joint secondarily, and produces a panarthritis, which is followed by bony ankylosis. Periarthritis, due to inflammations in the neighborhood of joints, often inhibits or obliterates motion by fixation of the peri-articular tissues. The joint, however, may be penetrated by the infection and a pan-arthritis result. The termination will then be in bony ankylosis.

Primary ossifying arthritis is a rare type of joint disease, slow in its progress, but inevitably resulting in bony ankylosis.

Static adhesive arthritis is a sequence of prolonged fixation and very rarely leads to osseous ankylosis. The limitation of motion is usually due to a fibrous synovial union between the joint surfaces.

Before considering the treatment of ankylosis we should study the formation of bursæ and hygromata, as they give us the key to the modern operations of arthroplasty.

All superficial bursæ are developed from fatty tissue as a result of pressure. The pres-

sure gradually produces an absorption of fat from within the fat cells and a coalescence of the small fat capsules. Coincident with this change in the fat cells there is a hyperplasia of the connective tissue, and its subsequent degeneration into collogen. The cells lining the newly developed cavity appear as flattened endothelial cells, but in reality they are merely transformed connective tissue cells. In the artificial formation of joints, therefore, it is important that the interposed fascia should have on it a layer of fatty tissue, which, when subjected to pressure, will form a hygroma. This new joint formation is not infrequently seen between the ends of the bone in ununited fractures. That it is possible to create new joints by operative procedures is demonstrated in the following experiment on a dog December 15, 1903.

The articular cartilages and synovial membrane were entirely removed from the head of the right femur and the acetabulum, after which a flap of fascia lata, with a layer of fat attached, was interposed between the bones. Wound closed without drainage. The dog was killed April 12, 1904, when it was found that motion was perfectly free in the new joint. A careful dissection showed that a new joint cavity had been formed between the bones. This cavity was lined with endothelial cells, and contained a quantity of sticky turbid fluid. (Synovial fluid.)

TREATMENT

The treatment of ankylosis in the past was limited to forcible separation of the adherent joint surfaces and attempts to prevent subsesequent fixation. In an enormous percentage of cases the ankylosis recurred.

In 1899 Helferich proposed an operation to free the fixed patella with chisel and mallet, and interpose a part of the vastus internus between it and the femur to prevent subsequent adhesion. He did not perform the operation, however. Cramer operated on seven cases of patellar ankylosis after this method, and secured good results in six cases. Chlumsky interposed foreign materials, such as plates of celluloid, silver, zinc, and rubber between the joint surfaces, but permanent results were not obtained. Hubscher used magnesium foil for the same purpose, and Gluck reported two cases where he interposed skin flaps in the tempo-maxillary articulation. The ultimate results were not given.

I performed my first arthroplasty with interposition of fascia, October 5, 1901, on a case of ankylosis of the knee joint, and secured a good result. The ankylosis has not recurred up to the present time.

In all plastic operations on ankylosed joints there are certain principles which must always be borne in mind. *First*, the bones must be completely separated from each other, and all bony prominences which interfere with free motion removed. *Second*, the entire capsule of the joint and all closely attached ligaments should be excised to permit of easy motion. *Third*, if there are contractions of tendons about the joint, producing permanent flexion, abduction or adduction, these tendons must be elongated by tendoplasty and the limb immobilized after operation, in a hyper-corrected position.

The joints most suitable for plastic operations are: first, the mandibular; second, hip; third, shoulder; fourth, elbow; fifth, knee.

The steps of the operation on (A) *the hip*, are briefly as follows:

1. A *U-shaped* incision through skin and fascia lata with the great trochanter in the center of the U.
2. Flap dissected upward.
3. Great trochanter sawn from femur and retracted upward.
4. Head of femur separated from acetabulum with curved chisel and then dislocated out of it.
5. Joint capsule excised.
6. Fascia lata and fatty tissue separated from skin flap and sutured over entire articular surface of femur.
7. Head of femur returned to socket.
8. Great trochanter turned into normal position and wired to femur.
9. Skin wound closed.
10. Limb immobilized in full extension and hyper-abduction.

(B) The knee, where there exists ankylosis between the femur and tibia and between the patella and femur:

1. Transverse incision across center of patella from condyle to condyle.
2. Patella sawn transversely, fragments separated from femur with chisel and mallet, and retracted upward and downward.
3. Femur separated from tibia with chisel and joint flexed.
4. Capsule anteriorly and laterally excised.
5. Aponeurosis of vastus internus exposed by incision upward on inner side, and a large flap of it with fatty tissue attached, dissected loose; pedicle below.
6. Fascial flap interposed between femur and tibia and sutured in position.
7. Aponeurosis of vastus externus exposed

by external incision, flap cut and placed between patella and femur; flap sutured in position.

8. Upper and lower fragments of patella brought together and wired.

9. Skin wound closed.

10. Limb immobilized in full extension.

(C) On the elbow:

1. Vertical incision posteriorly—6 inches long.

2. Olecranon sawn from ulna through an oblique line and retracted upward.

3. Bones separated, exostoses removed, olecranon depression deepened, if necessary, and capsule of joint excised.

4. Flap of triceps aponeurosis dissected loose, interposed between bone ends and sutured in place.

5. Olecranon replaced in normal position and wired to ulna.

6. Skin wound closed.

7. Arm and forearm immobilized at nearly a right angle.

AFTER-TREATMENT

In the hip cases a Buck's extension is applied immediately and left on for about three weeks. Passive motions are started in all of the cases at the end of about two weeks and continued daily thereafter. The patients are urged to move the joints actively after about three weeks.

RESULTS

Twelve cases have been operated on by the author up to the present time; three hip joints; six knees; three elbows. One of the most perfect results was secured in a case of bony ankylosis of the hip, which was caused by a gunshot wound. The head of the femur was necrotic and the neck and acetabulum formed practically one bone, with the thigh at right angles to the body. The result of the operation was perfect restoration of motion in the joint to normal degree in all directions. Another perfect result followed the operation on a bony ankylosis of the elbow. The motion after operation was of normal extent and entirely unrestricted.

In none of the cases did we have a recurrence of bony ankylosis, though in the earlier ones, the motion later became limited. This was due to the fact that all of the capsule was not removed, as in the later cases. For full details of the individual cases, we refer to the original article.

"An Experimental and Histological Study of Cargile Membrane." By Albert B. Craig, M.D. and Aller G. Ellis, M.D. (*Annals of Surgery*, June, 1905.)

The objects of the experiments, as carried out by the author, were to ascertain: 1. The efficacy of Cargile membrane in preventing adhesions in the abdominal and cranial cavities and around nerves and tendons; and 2. The ultimate fate of the membrane in the tissues.

Cargile membrane is an animal membrane prepared from the peritoneum of an ox, and first presented to the profession by Dr. Charles Cargile, of Bentonville, Arkansas. Two kinds, chromicized and unchromicized were used.

Dr. Craig's experiments were so carefully performed, and his observations so accurate, that his conclusions are most rational and logical.

The experiments are reported in detail, and he summarizes as follows:

"1. The most distant time at which we found unchromicized Cargile membrane existing intact, macroscopically, within the peritoneal cavity, was the fourteenth day; in most instances it had disappeared to macroscopic view much sooner. The earliest time at which we found the membrane had disappeared over the area of actual denudation was on the third day.

"2. Unchromicized Cargile membrane when buried in living animal tissue, as when placed around tendons and nerves, or in muscle, is apparently absorbed sooner than when placed within the peritoneal cavity. In no instance was so much as a fragment of the membrane observed microscopically so late as the fifth day, though in the fragmental state membrane was noted microscopically so late as the fourteenth day.

"3. Chromicized Cargile membrane when placed within the peritoneal cavity, or when buried in living animal tissue, remains unabsorbed much longer than does the unchromicized variety. The two varieties doubtless bear relatively the same relation to each other, so far as absorbability is concerned, as do chromicized and unchromicized catgut.

"4. While the unchromicized, and to a less extent the chromicized, variety will adhere fairly firmly to a surface denuded of peritoneum when such surface is relatively dry, yet neither can be depended upon to remain where placed, unless anchored by some method in a situation which is subject to peristaltic activity.

"5. A logical deduction from the results of the foregoing experiments seem to warrant the belief that neither variety of the membrane is of value in preventing adhesions within the peritoneal cavity. In every instance the membrane, until absorbed, appeared to act as a foreign body, and therefore as an irritant.

"6. We believe from the results of our observations, that both varieties of the membrane are of value in preventing adhesions to wounded nerves and tendons, when such structures lie in tissues which have been subjected to trauma, operative or otherwise. Our conviction is that for this purpose the chromicized is the more valuable.

"7. We believe that several layers of either variety of the membrane when placed around tendons or nerves afford a safer and better protection than one layer.

"8. We believe that, when used in the cranial cavity to replace destroyed or removed dura, the unchromizized variety would be exceedingly difficult to handle on account of its being unmanageable when moist; and we further believe, on account of the rapidity with which it dissolves, that it would be of no special value in this situation even though it could be used with ease. Owing to the facility with which the chromicized variety can be handled, its greater toughness and increased power to resist absorption, we believe that it would prove of greater value in replacing the dura.

"9. Our studies indicate that the membrane is destroyed by a lytic substance, or substances, contained in the body fluid. The celloidin capsule experiments, even though bacteria were present in one, show that the membrane is softened, and at least partially absorbed by body fluids without the presence of cells. In the tissues it is split into fibrils, this change being accompanied or followed by the penetration of formative cells of the new tissue enclosing it. Fragmentation, disintegration, and absorption finally ensue. Phagocytosis may safely be excluded as a chief important contributing cause."

POST OPERATIVE HEMORRHAGE THROUGH THE GASTRO-INTESTINAL TRACT. (*Centralblatt für Chirurgie*, June 24, 1905.)

Busse reports fourteen cases of post-operative hemorrhage through the gastro-intestinal tract, occurring in von Eiselsberg's clinic, in addition to eighty-two similar cases collected from current literature. In several of these cases, peptic or duodenal ulcers were found. Prior to the post-operative emesis, there had been no symptoms pointing to the pathological lesions found. Other etiological factors are anæmia, marasmus, toxæmias, such as uræmia, which may have been present at the time of the operation, or acute intoxications incited by the narcosis. Vascular changes such as increased blood tension caused by nervous disturbances, or by renal, hepatic, or pulmonary diseases must also be mentioned. The mere depressing effect of chloroform, may, in the presence of any of the above-mentioned disturbances, produce hemorrhage without there being any pathological lesions in the gastro-intestinal tract. In the majority of cases emesis was the exciting cause. Surgical trauma, compression or twisting of stomach or bowel, loosening up of adhesions, repairing of lacerated tissues, etc., may also be the direct cause of hemorrhage, through the formation of emboli. Von Eiselsberg considers the ligation of omentum or mesenteric vessels as important etiological factors. The displacement of emboli may be direct or retrograde. In 35 per cent of all cases collected, omental or mesenteric vessel ligations had been resorted to. Busse believes that the above-mentioned conditions predispose to the formation of ulcers, but that the post-operative emesis is necessary to produce hemorrhage. The prognosis is grave, and therapy merely symptomatic.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF GYNECOLOGY

UNDER THE CHARGE OF

J. CLARENCE WEBSTER, M. D. E. C. DUDLEY, M. D.
JOHN C. HOLLISTER, M. D.

"DER WERTH DER DRÜSENAUSRÄUMUNG BEI DER OPERATION DES UTERUSCARCINOMS." Von Karl Baisch. (*Arch. f. Gyn.* 1905—B. 75–2.)

After Ries's paper in 1895 the removal of regional glands in cancer of the uterus was generally considered as important as in carcinoma of the mamma until Wertheim's paper in 1904, who, with Shauta, has concluded such a procedure to be impracticable and illogical.

The author's conclusions are based upon findings in 125 cancer operations at Döderlein's clinic—in 18 cases at post-mortem soon after operation microscopical examinations were made from the "essential" serial sections.

He refers to the different well-known anatomists who have described the genital lymphatics, and then says, "The system of uterine lymphatic vessels and glands is, in spite of its abundant development, unusually simple since it is constant." He speaks of the close relationship between the blood-vessels and lymphatics in their location, and then he traces in detail the lymphatic trunks from the cervix and portio, and describes the glands in the parametrium, the iliac and hypogastric glands, and then the course of the channels from the body to the aortic and lumbar glands and their intimate connection with the ovarian lymphatics. After describing the lymphatics from the middle of the body to their end stations in the inguinal glands, he finally classifies the regional glands as

1. Parametrial.
2. Iliac.
3. Hypogastric.
4. Sacral.
5. Lumbar.
6. Inguinal.

"These six groups must be considered logically, as one group, since they are the first end stations of the lymphatics from the collum and corpus." This is also Winter's view, but Shauta considered the lumbar and inguinal glands as a second group. The author thinks that as a second group for the collum should be considered glands lying to the internal side of the external iliac and along the common iliac and also the lumbar glands, and as a second group for the body should be assigned the aortic and celiac glands.

Communications between the different gland groups are described, and their connections with blood-vessels, nerves, and the different pelvic organs are so intimate "that the thought of a complete removal of the lymph vessel system of the internal genitalia of a living woman can be considered only as chimerical. On the contrary, it is true that the possibility of removal of the first group of glands is perfectly feasible, since they with rare exceptions, enlarged with inflammatory hyperplasia or hardened by cancer deposits in the typical places, are easily apparent to the touch." "To determine the feasibility one must consider the method of spreading of the carcinoma, whether continuously or by skipping over glands, etc."

Carcinoma of the body remains for a long time, limited to the organ (Seelig). An involvement of the parametrium practically never follows in the operable stage. Same is true of gland metastasis. In 24 body-carcinoma cases diseased glands were found only four times by the author, although the invasion of cancer was marked, and involvement of the parametrium occurred only once. He does not agree with Williams that body cancer has a more unfavorable prognosis than cervix cancer, and after giving statistics from several authors, he says, "So we can consider vaginal total extirpation for body cancer completely adequate, unless the large size of the uterus compels one to use the abdominal route, and even then it is not necessary to remove widely the parametrium." He recites a case showing the close lymphatic relationship between ovary and uterus, which argues for the removal of the adenexa at the same time.

"Essentially different is the development of the *Collum Cancer* on the inside of the uterus as well as in the parametria and lymph vessels."

He quotes Kundrat's figures as authentic concerning the participation of the parametria

in such cases, as they are based on 160 cases serially sectioned. He found the parametria involved in 55 per cent of collum cancer cases, and as these figures agree with others "one may conclude that in something more than one-half the collum cancer cases, the parametrium has been involved." He then says, "We agree with the claim that the parametrium can be carcinomatous although it feels soft and sound, and also it can be free from cancer although thickened and hard."

He speaks of Kundrat's findings as to the way cancer from a primary focus in the collum spreads into the parametrium, and of his conclusion that in cases of collum cancer the parametria should be removed as widely as possible, and says this holds good in early, as well as in advanced stages.

Relative to the parts of the lymphatic system that have been attacked by metastases, he also quotes Kundrat's findings as important—"No carcinoma around the nodes, but within them only"—and Oehlecker found "carcinoma in the glands, but never in the lymph vessels,"—Shauta once in 271 cases; and then he says, "The method by which cancer metastases occur—the remaining free of the lymph vessels which must be considered as the usual condition—is of extraordinary practical significance. It shows us the absolute necessity of wide removal of the parametrium, as it shows, on the other hand, that the removal of all the lymph channels is superfluous."

He then considers the *Cancer invasion of the lymph glands* and takes up

I. The Frequency of its Occurrence and its Relation to Involvement of the Parametrium.

He quotes many authors and their percentages, criticises their methods, and then summing up all the more reliable figures he says: "If we consider that all the material upon which the figures are based is not absolutely of equal value, that above all the participation of the body carcinoma is variable; further, that the number of cases at most is somewhat small upon which to base percentages, then the differences between the individual investigators seem unessential and we will come very near the truth when we say on the average that the involvement of the glands in operable collum cancer occurs in one-third of the cases."

"It follows, therefore, that to expect a cure by vaginal methods in one-third of the 'Hals' cancer cases is hopeless."

He also says here—"There is no basis for the statement that glands are able to destroy carcinoma."

"Relative to the gland involvement where the parametria have been attacked by carcinoma, we can put down 50 per cent as a further constant in the statistics of the gland question" is his conclusion after carefully considering the results obtained by others and himself.

II. The Relation of the Histological Nature of the Primary Tumor to the Frequency or Rarity of Gland Metastases.

He quotes here Wertheim, Kustner, Kermauner, Lameris, Tiburtius, Beckmann, Kleinhaus, Jacobs, Cullen, and Kelly. Then gives his own figures and concludes as follows: "Thus it is evident from *all* findings, that the fact that there is a clinical integrity of the parametrium and a slight extension of the new growth is no guarantee that the glands are free; that, to place it in figures, one must reckon with the possibility of metastasis in lymph glands in from one-tenth to one-fifth of the cases."

As to the kind of carcinoma relative to extension by metastasis, he concludes as follows: "The idea that squamous epithelium and portio carcinoma are on the one side and cylindrical epithelium and cervix cancer on the other side, does not by any means coincide with the facts."

The results of his own cases are as follows:

Of 32 portio-carcinoma cases, in 10 the parametria were infiltrated, in 22 the parametria were free.

Of 22 free parametria cases, 2 had carcinomatous glands, 20 had no carcinomatous glands.

Of 58 cervix carcinoma cases, 28 had infiltrated parametria, 30 had free parametria.

Of 30 free parametria cases, 8 had carcinomatous glands, 22 had no carcinomatous glands.

"Therefore, in portio-carcinoma the relation of the disease to the free parametria is as 1 to 2; in cervix-carcinoma as 1 to 1."

His findings show also that portio-cancer in early stages does not lead to gland metastasis, and vaginal extirpation with wide removal of the parametria by means of Schuchart's paravaginal incisions is adequate.

Further he says, "In general, all true carcinomata in cases of young women during gravid states or the puerparium, are especially active" and gives his findings—of 188 carcinoma (1900–1904) operations, 12 per cent were made under 40 years of age—among the inoperable cases during the same time, 9 per cent were under 40.

"According to these statistics we must, at least for all collum cancers, possibly with the exception of the very beginning stages of portio-carcinoma, employ the abdominal radical operation with the removal of the glands. Shauta recognizes the theoretical justification for gland removal, and therefore for the abdominal method, but says the practical carrying out of this is impossible. His figures and conclusions are given in detail.

III. The Order in Which the Single Gland Stations are Involved.

Shauta's percentages are again quoted and criticised and the question of the metastases skipping over intermediate gland stations discussed. Winter's and Oehlecker's statistics as well as Baumgarten's are considered very carefully, and then he says, "From the operative material as also from the post-mortem observations, it therefore follows that the occurrence of metastasis of the glands follows physiological anatomical paths, has a regular sequence, and knows no 'spünge.' "

He then says, "Upon the basis of results obtained up to this time seeking for the glands is a rational procedure, to give it up is irrational."

In regard to the practical value of removal of the glands, he emphasizes two factors which strongly oppose the earlier uncertain theories:

(a) The question of recurrence.

(b) The impossibility of finding all the glands even by the most thorough examination at the time of operation.

Wertheim had recurrences in nearly all cases where glands were removed.

"Of our 8 cases in 1902 still living, 3 are still free from recurrence.

"Of our 6 cases in 1903 still living, 3 are still free from recurrence."

From his own experiences, he says it would be false to consider them as arguing against searching for glands or against the abdominal method, likewise equally false to consider that they pointed favorably to a wider removal of all the lymphatic vessels.

He ends by saying the abdominal method has the advantage not only of allowing wide removal of glands, but also of protection during operation of the ureters, etc.

The Permanent Results of Ventro-Fixation. By F. Weindler. (*Monatsschrift für Geburtshülfe und Gynäkologie*, Vol. XXI., No. 6, pp. 753-778.)

Weindler, in a lengthy paper, gives the gynecologic and obstetric results following the use of Leopold's method of ventro-fixation in the Dresden Klinik. The method is described as follows: The uterus is freed from its adhesions, and brought to the abdominal wound which should be relatively small. A silk suture is passed through all the layers of the abdominal wall, then passes under the uterine peritoneum slightly below the places of insertion of the round ligaments to a breadth of about two centimeters, and then out through the abdominal wall: a second suture is passed in like manner about a centimeter below the first, which again includes uterine musculature. Thereafter, the abdominal wound is closed; the final act is to draw the abdomino-uterine sutures together and tie—this bringing the uterus firmly in contact with the parietal peritoneum. He considers the large silk sutures are an essential part of the process as their protracted presence causes a local reaction which more certainly secures permanency of result.

The material is taken from 51 cases operated upon during the years 1896–1903. Of these 51 women, 32 returned after an interval of between one and six years for an examination: of the 32 patients, 11 became pregnant in a relatively short time. In two of the cases an opportunity was afforded of making repeated examinations during the pregnancy; in both no anomalies of development or mobility were ascertainable. On this account he states it is a false assumption to declare the development of the pregnant uterus after ventro-fixation will occur at the expense of the posterior wall. A correct technic which leaves the fundus of the uterus free will not hinder the proper expansion of the uterus. A claim is made that the adhesions will stretch during pregnancy, and then will participate in the involution with the uterus, and ultimately will assume the position fixed by the operation. No disturbance of pregnancy was noted. The labors occurred normally with one exception, in which forceps were used. He denies the danger of abnormal positions as a result of Leopold's method. Likewise he objects to the statement that the fixation makes the woman prone to miscarry. The puerperium ran a normal course in each of the labors: there was not an instance of liberation of the fixed uterus by the pregnancy or labor.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF OBSTETRICS

UNDER THE CHARGE OF

C. S. BACON, M. D. RUDOLPH W. HOLMES, M. D.
C. V. BACHELLÉ, M. D.

GANGRENE FOLLOWING ECLAMPSIA. Otto Gutbrod. (*Monatsschrift für Geburtshülfe und Gynäkologie*, Vol. XXI., No. 6, June, 1905.)

DR. GUTBROD reports a condition of great rarity, which he states has never been described in literature—gangrene following eclampsia. (In this he is error as M. A. Tate, *American Journal of Obstetrics*, April, 1898, reports an illustrative case similar to his.—Ed.) The first patient had fifteen convulsions: during her coma she had repeated hot sweats. When removed from one of these it was noted that opposing skin surfaces gave signs of beginning gangrene. The gangrene was limited to the cutaneous and subcutaneous tissue. On the forty-sixth day the gangrene surfaces were healed with the exception of a small area on one foot. On account of abscesses, which developed later, it was necessary to amputate the leg below the knee. The second case had repeated convulsions: following these a puerperal psychosis developed. On the ninth day she was permitted to get out of bed, that evening the temperature suddenly rose, a blue-black spot appeared on the left great toe, shortly thereafter the leg to the knee became a dark red. As in the other case the gangrene was limited to the skin and subcutaneous structures. Repair was completed in four months. Gutbord believes the gangrene is due, at least partly, to the fact that some of the eclampsia poison is excreted through the skin, causing the gangrene. He substantiates this belief in the fact that often eclamptics have necrotic areas in various organs, especially the kidney and liver. In conclusion he feels that a predisposition for the skin to become gangrenous must have been present in both cases, for otherwise gangrene of the skin would be observed more frequently in eclampsia.

THE TREATMENT OF HYPEREMESIS GRAVIDARUM. R. Von Uhle. (*Centralblatt für Gynäkologie*, No. 24, June, 1905.)

DR. UHLE considers that there is but one point in the subject in which authorities seem to be a unit, and that is in grave cases the proper treatment is the interruption of the pregnancy. The etiology is a moot question, various authors ascribe the cause of the disease to the different organs of the body; for example: Kaltenbach considers the cause to be an hysteria; Ehrendorfer ascribed the cause to a decided nervous disposition; Dirmoser maintains excessive vomiting is due to an intestinal intoxication; Wanchope holds that the primal factor is the retention of toxins of pregnancy; Champétier de Ribes defends the hepatic origin of the disease; Monin pins his faith in the retention of some secretion anomaly, while Behm contends that intoxication is produced by the ovasac, possibly syncytial in character; Ziegenspeck supports the view that an inflammatory process in and about the uterus is the main consideration; Müller expresses the view that the vomiting is due to an irritation of the sympathetic nerves; Tuszkai believes the cause is due to the production of an anemia and irritation of the perimetria from a stretching of the uterus; finally, Evans maintains that contractions of the uterus reflexly produce nausea, and their accentuation to a true hyperemesis.

As the etiologic factors are so diverse, the methods of treatment so varied, the successes and failures are many, the assumption may be made that hyperemesis gravidarum is not an uniform characteristic disease.

He reports a case in which, in spite of gastric lavage, absolute rest of the stomach, ice-bag over the stomach, rectal alimentation, subcutaneous injections of morphia, the vomiting persisted. The woman had advanced to the tenth or twelfth week with a progressive emaciation: as a sharp anteflexion of the uterus was present it was considered this might have a bearing on the cause. Considering a correction of the abnormal position of the uterus might have a beneficial effect on the vomiting, a colpeurynter was placed in the vagina and moderately filled. At once there was a cessation of the vomiting. Some hours

later it appeared as if labor had set in so the bag was removed. The next day examination elicited the apparent fact that an abortion was in progress. Pains stopped: when vomiting began again the colpeurynter was reintroduced with beneficial results. At full time an healthy girl was born. Uhle maintains there were no hysterical stigmata about the case, and that the result was not due to suggestion, and that the result was the direct effect of the method used.

Cæsarean Section on the Dying. H. Füth. (*Centralblatt f. Gyn.*, No. 23, June 10, 1905.)

The basis of the brief paper was a report of a moribund case upon whom the Cæsarean Section was performed. The patient was thirty-five years old, who had spontaneously borne six healthy children. She entered the clinic on account of a marked dyspnœa which had existed for fourteen days. The heart was found enormously enlarged: a systolic mitral murmur was heard. The lungs were involved: apices had rales, and crepitant rales were heard through the lower portions of the lungs. While resting quietly in bed she suddenly developed a most intense dyspnœa, and expectorated a clear red fluid from the lungs—fully a half leter. The face became deeply cyanosed. Medication had no effect: the pulse became worse, consciousness was lost. When consciousness was fully lost and she was pulseless the section was undertaken. The child was born with a slow pulse, but was resuscitated. Consciousness returned finally, the temperature ascended, but the pulse, in spite of all stimulation, remained fast and weak. On the fifth day death occurred suddenly. The post-mortem examination showed an ulcerative endocarditis, with involvement of the mitral and aortic valves. The kidneys contained embolic infarcts.

He maintains that it is not right to await the advent of the death agony, but with the idea of saving the child, and possibly being of some use to the mother, a timely operation should be done. The results following Cæsarean sections on the dying have been poor for the child as they were performed too late: of 331 operations in the past only six or seven children were saved. He feels, with Grenser, that it is not proper for a single physician to undertake the operation in private on account of the possible results: in a clinic the circumstances are different, as a number of physicians are generally present.

Katz, R., The Perforation of the Living Child in Maternity Hospitals. (*Monatsschrift für Geburtshülfe und Gynäkologie*, Bd. XXI., Heft. 4, pp. 461–481.)

Katz takes issue with Ahlfeld and Pinard who assert that craniotomy on the living child should be discarded under all circumstances. In the Maternity Asylum of Mannheim, it has been found impossible to supplant entirely craniotomy by cæsarean section and symphyseotomy. He considers that Veit starts from a false premise when he asserts that craniotomy, cæsarean section, and symphyseotomy have the same mortality of *nil*. Katz believes that cæsarean section is practically without danger if the woman comes to the clinic under the following conditions: no fever, no examinations, perfectly well, intact membranes, good operator, and not previously infected. Scarcely a woman should die in the operation under these circumstances, but more certainly would she not die from a craniotomy. On the other hand, craniotomy offers better chances when infection is present, during a protracted labor, when repeated examinations have been made, than a cæsarean section.

In Mannheim the craniotomy has been done among 6,935 parturients 26 times on living or dying children—a percentage of .37. A detailed report of the circumstances demanding the craniotomies is given. Of the 26 women two died, one from sepsis (the midwife in attendance having just lost two other women from infection), the other from eclampsia, a mortality of 7.69 per cent. In comparison to these figures he maintains that symphyseotomy has a mortality of 10 per cent, although the operation is almost exclusively performed in clinics, and the child has not the same chances as in cæsarean section, as Pinard's figures show. In spite of the statement of Zweifel that the maternal mortality is 7 per cent, Veit asserts the prognosis is absolutely good. Further, Katz claims the mortality for cæsarean section is 10 per cent.

Katz's conclusion is: If propitious circumstances do not attend the case do a perforation, in succeeding pregnancies induce premature labor, or under ideal conditions, do cæsarean section.

Kriwski, L. A., A Group of Cases of Repeated Cæsarean Sections. (*Monatsschrift für Geburtshülfe und Gynäkologie*, XXI., i, pp. 41–45.)

This paper mentions the fact that up to the year 1904 there were 88 women who had had repeated cæsarean sections: of these cases, 72 had two, 13 had three, and 3 had four operations. Kriwski reports in detail the operations performed by Phaenomenow and Stolypinski. The question of adhesions resulting from the previous

operation compromising the technic of the subsequent procedure, is discussed. According to Wallace these adhesions are present in 84 per cent of the cases: the dangers of the adhesions are the protraction of the operation, hemorrhage from the severed adhesions, atonic hemorrhages from the uterus, possibility of intestinal injuries, and malpositions of the uterus. It is possible that extensive adhesions have a positive significance, for they permit, in repeated operations, the possibility of manipulating entirely extraperitoneally. Some operators have had this possibility in view and have encouraged extensive adhesions to minimize the danger of infection in subsequent operations, a benefit of small utility in the present aseptic period. Cæsarean section does not necessarily sterilize the woman.

CHOLECYSTITIS IN THE PUERPERIUM. (*Monatsschrift für Geburtshülfe und Gynäkologie*, Bd. XXI., Hft. 1, pp. 45–52.)

Christiani, of Libau, reports two cases of this complication of the puerperium, and briefly summarizes the relation of cholecystitis and the puerperium. He cites the belief of Frierchs that pregnancy plays a certain etiologic rôle in cholelithiasis. He considers it is not yet determined whether the growing uterus produces hepatic congestion by pressure, with a resultant invasion of micro-organisms, inflammatory changes in the gall-bladder wall, and dependent thereon, the formation of the stones, or, perhaps, the rapidly changing pressure condition during the labor, causes a migration of the stones with the production of colics. If Fellner's figures (5 cases in 40,000) obtained from the Schauta Clinic are correct, then it would seem that the importance of the etiologic relation between labor and cholelithiasis has been overestimated. Kehr maintains that 10 per cent of women in the childbearing period have gall-stones: for conservative reasons Christiani admits only 3 per cent; so one might consider that Schauta's clinic should have had 240 instances of gall-stone colic in each 8,000 instead of one; on theoretic grounds, therefore, labor cannot have a relation to the question of cholelithiasis.

The slight meteorism, the right-sided, uncertain, painful resistance, vomiting, constipation, may arouse the suspicion of an infection: the writer is convinced that the paucity of case reports is due to the too often error of diagnosis. Two signs appear to Christiani to be of great diagnostic importance: one, the bile-stained vomitus with hardly an evident peritoneal disturbance; secondly, and principally, the full, slow pulse, which is not in consonance with a fever due to a pyemia. While it is right to first consider every fever of the puerperium as a puerperal infection, we must not overlook other diseases, that a temperature may arise, too, from a simple disturbance in the gall-bladder and the appendix.

As to therapy: In general it is expedient to employ the knife earlier in the puerperium than outside of the same. During pregnancy and the puerperium more easily may there be an extension of the inflammatory process to the liver than under normal conditions. Pregnancy and the puerperium do not increase the dangers of the operation.

REVIEWS

ATLAS AND TEXT-BOOK OF TOPOGRAPHIC AND APPLIED ANATOMY. Schultze-Stewart. Published by W. B. Saunders & Company, 1905.

The tendency of recent years in anatomical teaching has been to supplement the systematic text-books of anatomy with atlases. The welcome reception accorded the atlases of Spalteholz and Poldt testify to the value of this method in anatomical teaching. The Schultze-Stewart Atlas and Text-Book of Topographic and Applied Anatomy should occupy the same place in surgical anatomy that the above two atlases do in systematic anatomy.

The attempt has been made throughout the book to make a careful selection of the most important anatomical points, which will be of service to the physician at the bedside and the surgeon at the operating-table, avoiding useless detail. Wherever possible the simplest and most satisfactory guides have been given. In craniocerebral topography the author has made a wise selection of the Krönlein and Froriek method, dispensing with other good, but complicated, procedures. The clear and concise statement of the methods by which the different viscera may be approached is a very commendable feature of the book, which is best illustrated in the discussion of the surgical anatomy of the pancreas (p. 134) and kidney (p. 141). The discussion of the surgical anatomy of the joints is well handled. Excellent illustrations of the important articulations with neighboring bursæ are a valuable feature, which has been sadly neglected in many other atlases of applied and surgical anatomy. The usefulness of his models in anatomical teaching has been proven, and the reproduction of several of these models enables one to study to the best advantage the form and spatial relations of the different viscera. Enough cross-sections are included to enable student or practitioner to refresh easily his memory concerning the relations of bones, muscles, arteries, and nerves.

The author has been successful in his effort to avoid prolixity. We believe, however, that the book would have been of immensely more value to students and practicing physicians if more attention had been paid to the important fasciæ (cervical, axillary, perineal, palmar, and plantar). The lymphatics have not received the attention that they should. The description of each organ, especially those most frequently the seat of malignant disease, should be accompanied by a chart, illustrating the organ, course and termination of its lymphatics. Preparations of lymphatics by the older Sappey method, preferably by the more recent Gerota. Berlin blue injection method have a decided teaching value. It is to be regretted that the surgical anatomy of the spine and its contents has received no more attention.

However, the choice of subjects and the space alloted to each is at most a personal matter, and represents the relative value of each in the author's mind. It is difficult to emphasize some points without neglecting others and almost impossible in a book of this character to devote to each subject the space that it deserves. The book is of convenient size, well bound, printed upon good paper, profusely and well illustrated. Notwithstanding some of the defects above mentioned, we believe it to be the best atlas and text-book in English and one which we can heartily recommend to all.

DEAN D. LEWIS, M. D., Chicago.

A TEXT-BOOK ON THE PRACTICE OF GYNÆCOLOGY, for Practitioners and Students. By William Easterly Ashton, M.D., LL.D., Professor of Gynæcology in the Medico-Chirurgical College of Philadelphia. With 1,046 new line drawings. W. B. Saunders and Company.

This text-book by the well-known author and teacher deserves very careful consideration. The treatise is not a compilation of the works of others, but is a very concise, lucid, and detailed account of the author's opinions, and is based upon his extensive experience in practice and in teaching. The minutest detail is given in the treatment and especially in the descriptions of operative technic. The numerous illustrations are well executed, and add very much to the value of the book. The lucid text and the "line drawings" should make the subject easy for any student or practitioner to master. The book is divided into forty-five chapters and is arranged chiefly upon an anatomic basis. The author uses this classification so as to discuss the methods

of examining each organ before describing its diseases, and to thus avoid the usual chapter on physical examination. This is the usual arrangement in text-books on gynæcology and is, it seems to me, and also from analogy, much inferior to a classification based upon a pathologic and etiologic basis. Who would advocate a discussion of typhoid fever in numerous chapters along with other diseases as it affects the various organs of the body? Under such arrangements typhoid fever would be discussed under chapters entitled: the intestines, the mouth, the kidneys, the skin, etc. Such a division as applied above to typhoid fever is very similar to the usual method employed in the discussion of the various pelvic infections, the traumatisms of labor, etc. This criticism does not apply to this book any more than to most treatises upon gynæcology.

Another peculiarity observed in most text-books upon diseases of women is the large number of chapters that appear before the "diseases" are discussed. These chapters are usually of little aid in the study of the diseases, of little interest or use, and chiefly unintelligible to the student until he knows something of the diseases. Why should they not like "Osler's Practice of Medicine," commence the discussion of the disease upon the first page?

The text contains numerous sub-heads which facilitates its use for reference but interferes somewhat in bringing out the whys and wherefores and possibly tends to appeal to the student's memory more than to his reason.

The chapters on "Microscopic and Bacteriologic Examinations," "The Blood in Relation to Surgery," "The X-Rays in Gynæcology," Hydrothropy," "Indoor Exercise," "Echinococcus Disease of the Pelvis," contain much new matter, and are well presented in a thoroughly practical manner.

A valuable feature of the book is the importance given to asepsis in presenting methods of examination and in the description of operations. The absence of descriptions of numerous operations for the same disease is refreshing and the technic of the operations which the author advocates by "steps" and in detail, make them very easily understood

The time given for patients to remain in bed seems longer than is necessary, as early getting up does not interfere with union and prevents the general muscular weakness that remaining two to four weeks in bed produces. The illustrations which show the normal location of the uterus is about the same as usually appears in text-books, namely: About midway between the sacrum and pubes and yet examination of normal cases shows the cervix about one inch above the coccyx and about one inch in front of the sacrum.

Dr. Ashton continues to make abdominal suspensions for uterine prolapse and retro-positions, although the results are often not permanent, as the union often elongates and sometimes produces intestinal complications. The method of producing sterility by ligation of the Fallopian tubes as given on page 332 has been found upon observation to not insure sterility as the ligatures usually cut through the tubes and leave them potent.

The author has possibly mistaken some anti-flexions of the uterus for some types of "Infantile" uterus. There is some question as to whether ante-position of the uterus are ever pathologic. Reports of cases of incision of the anterior or posterior wall of the cervix for reduction of chronic inversion of the uterus would indicate that to be the ideal treatment. The book attaches too much importance to lacerations of the cervix uteri as small lacerations are harmless, as most erosions of the cervix are chiefly due to a septic endometritis, and as the views relative to the "cicatricial plug," "Reflex symptoms from the cervix," etc., have been largely abandoned.

There is much to commend and very little to criticise in the book.

The book taken as a whole is extremely satisfactory, is a valuable addition to the literature of gynæcology and its perusal is certain to supply the specialist with many valuable hints, and the general practitioner with a conservative and sure guide in the treatment of gynæcologic diseases. It is admirably adapted to the needs of the under graduate medical student.

The work of the publishers is also excellent.

THOMAS J. WATKINS.

THE DIAGNOSIS OF DISEASES OF WOMEN. A Treatise for Students and Practitioners, by Palmer Findley, B. S., M. D., Assistant Professor of Gynecology and Obstetrics, Rush Medical College, Chicago, etc. Second Edition, Revised and Enlarged. Publishers Lea Brothers & Co., Philadelphia and New York, 1905.

It is obvious, even to the casual observer, that in the deluge of medical journals, society proceedings, and text-books in our country, a certain preponderance is given to the therapeutic side of medicine rather than to diagnostics and pathology. In consequence, the interference of the physician only too often lacks that solid foundation without

which treatment frequently is mere experimentation. From this standpoint we must warmly indorse every effort to emphasize the immense importance of an exact diagnosis. Such an effort has been achieved in Findley's "Diagnosis of Diseases of Women." This book which first appeared only two years ago, is now in our hands in its second edition.

The first part of the book is devoted to an exhaustive consideration of all methods at our disposal by which to arrive at a diagnosis. The proper way of recording the clinical history of a case is clearly set forth and is rendered even more comprehensive by an analytical study of certain general conditions which play an important part in every anamnesis, viz., uterine hemorrhage, amenorrhœa, dysmenorrhœa, sterility, menopause, and leucorrhœa. The chapters on physical examination comprising inspection, palpation, percussion, auscultation, etc., culminate in the sentence that bimanual examination is the most valuable of all physical explorations of the pelvis. The advantages and contraindications of the use of instruments in making a gynecological diagnosis are lucidly put before us. The chapters on the uterine sound and curette and their dangers in inexperienced and non-discriminating hands should carefully be read by all practitioners. The chapters on blood and bacteriological examinations have been added to the second edition of the book. "In routine clinical work the examination of the blood is of no less importance than the analysis of the urine. In a large percentage of cases, no additional information will be afforded by examining the blood, but in those cases where the responsibility is the greatest, these examinations become of the highest value."

The second part of the work deals with the special diagnosis. The chapter on diagnosis of carcinoma of the uterus, is altogether splendidly written. We feel convinced that from its perusal every reader will derive great benefit, and we cannot but emphasize the author's indorsement of the oft-made plea: "It is the family physician, not the specialist, who first sees these cases, and it is to him we must look for the early recognition of the danger, if not for positive diagnosis." In the chapter on hydatiform mole, we find ourselves in a field particularly familiar to the author from his own original contributions. It is impossible to consider all that is offered in this part, within the scope of a review. Suffice it to say that everywhere the author proves that he has digested the most advanced views laid down in the medical literature of the world.

The last part of the book is devoted to the diagnosis of the urinary system. Affections of the urethra and bladder in the female are often so closely allied to diseases of the genital tract that their consideration belongs by right to the gynecologist. For the diseases of the ureters in women there should be no more competent judge than the gynecologist; and as to affections of the kidney, finally, we are in a borderland in which we should work in harmonious co-operation with the general surgeon.

A reviewer is by nature a severe critic, but it is with pleasure that we can say that the author has accomplished his task in every important respect. There are but few, and these minor, objections that one may raise. One of them is a reference to Sarah—or, as a certain writer has termed her, Mrs. Abraham—as an illustration of the possibility of pregnancy after the cessation of menses (p. 45). We see the value of the Bible in a direction other than that of a medical reference book, and we trust that the author will be able to find, for the third edition of his work, a case in point from medical literature which may be subjected more readily to modern critical analysis.

The book which has increased nearly one hundred pages in reading matter over the first edition, presents a very pleasing appearance. It is lavishly illustrated with two hundred and twenty-two engravings in the text and fifty-nine plates in colors and monochrome. The book merits success.

G. GELLHORN, St. Louis.